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DERWENT- 200257

WEEK:

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TITLE: Photopolymeric composition, useful for e.g. three-dimensional stereo lithography or holography, contains a cyanide-containing compound and photopolymerization initiator

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PATENT-ASSIGNEE: FUJI PHOTO FILM CO LTD[FUJF]

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PATENT-FAMILY:

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APPLICATION-DATA:

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JP2002105128A	N/A		2000JP-294212 September 27, 2000

INT-CL-

CURRENT:

TYPE	IPC	DATE
CIPP	<u>G03</u> <u>F</u> <u>7/027</u>	20060101
CIPS	<u>C08</u> <u>F</u> <u>2/50</u>	20060101
CIPS	<u>C08</u> <u>F</u> <u>20/42</u>	20060101
CIPS	<u>G03</u> <u>F</u> <u>7/00</u>	20060101
CIPS	<u>G03</u> <u>F</u> <u>7/028</u>	20060101
CIPS	<u>G03</u> <u>F</u> <u>7/038</u>	20060101

ABSTRACTED-PUB-NO: JP 2002105128 A

BASIC-ABSTRACT:

NOVELTY - A photopolymeric composition contains a cyanide-containing compound (I) and a photopolymerization initiator.

DESCRIPTION - A photopolymeric composition contains a cyanide-containing compound of formula (I) and a photopolymerization initiator.

X1 = hetero or halo;

Ra, Rb = H, halo, cyano, or organic residue; and

Ra and Rb, X1 and Ra or Rb = optionally forms cyclic structure by bonding to each other.

USE - The photopolymeric composition is used for a photopolymeric material and is used for three-dimensional stereo lithography, holography, an image forming material, including a plate material for lithographic printing, color proofing, photoresist, color filter, or a photocuring resin material, including ink, coating material, adhesive. The photopolymeric composition particularly finds its application in direct graphic arts, using various lasers from a digital signal in a computer.

ADVANTAGE - In photoradical polymerization-based compositions having the highest sensitivity in image formation technique, the photopolymeric composition has superior high sensitivity and shelf life stability. Particularly, the photopolymeric composition is suitably used for the plate material for the lithographic printing capable of direct graphic arts from digital data in the computer by recording, using a solid laser, semiconductor laser light emitting ultraviolet light, visible light, and infrared light.

EQUIVALENT-ABSTRACTS:

No relevant example given.

TITLE- TERMS: PHOTOPOLYMERISE COMPOSITION USEFUL THREE DIMENSION STEREO LITHO HOLOGRAM CONTAIN CYANIDE COMPOUND INITIATE

DERWENT-CLASS: A14 A41 E16 G02 G03 G06 P84

CPI-CODES: A11-B16; A12-B01; A12-L02; A12-L03; A12-W07; E07-H; E10-A15F; G02-A02; G02-A04A; G05-A01; G06-D02; G06-D04; G06-D05; G06-F03C; G06-F03D;

CHEMICAL-CODES: Chemical Indexing M3 *01* Fragmentation Code C116 C316 G010 G013 G019 G100 H103 H141 H181 H402 H482 H583 H7 H716 H721 H723 J011 J371 K0 K351 K353 L1 L145 L410 L432 L462 L463 L520 M121 M143 M210 M211 M213 M214 M216 M231 M240

M262 M271 M272 M273 M280 M281 M282 M312 M313 M321 M322
M331 M332 M342 M381 M382 M383 M391 M392 M414 M416 M510
M520 M531 M532 M540 M782 Q331 Q332 Q344 R043 Markush
Compounds 006858402

Chemical Indexing M3 *02* Fragmentation Code G012 G013
G019 G100 H542 H582 H583 H584 J012 J013 J014 J231 J232
J272 J273 J581 K0 K432 K499 L1 L145 L199 L410 L462 L463
L472 L499 L541 M121 M132 M150 M280 M311 M312 M313 M314
M315 M316 M321 M322 M323 M331 M332 M340 M342 M373 M381
M382 M383 M391 M392 M393 M414 M416 M510 M520 M531 M532
M540 M620 M782 Q331 Q332 Q344 R043 Markush Compounds
006858403

Chemical Indexing M3 *03* Fragmentation Code G016 G100
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M540 M782 Q331 Q332 Q344 R043 Markush Compounds 006858404

Chemical Indexing M3 *04* Fragmentation Code C316 G013
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M314 M315 M321 M322 M323 M331 M332 M342 M381 M382 M383
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Chemical Indexing M3 *05* Fragmentation Code F011 F014
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M349 M381 M382 M383 M391 M392 M393 M413 M414 M416 M510
M520 M521 M530 M531 M540 M782 Q331 Q332 Q344 R043 Markush
Compounds 006858405

ENHANCED-POLYMER-INDEXING: Polymer Index [1.1] 018 ; G0486 G0475 G0260 G0022 D01
D12 D10 D26 D51 D53 F12 D22*R D58 D69 7A*R; H0000;
H0011*R; P0088;

Polymer Index [1.2] 018 ; B9999 B3532 B3372; Q9999 Q7476
Q7330; Q9999 Q8684 Q8673 Q8606; K9858 K9847 K9790; K9869
K9847 K9790; K9870 K9847 K9790; K9836 K9790; N9999 N7307
N6440; Q9999 Q8640 Q8606; Q9999 Q9450 Q8264; Q9999 Q8797
Q8775; Q9999 Q7114*R; Q9999 Q6644*R; ND01;

SECONDARY-ACC-NO:

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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

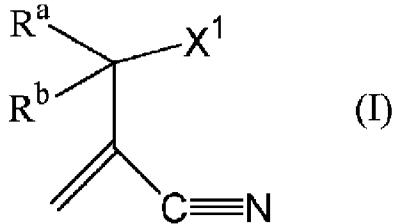
Translated: 02:52:41 JST 04/14/2010

Dictionary: Last updated 03/12/2010 / Priority:

CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1]A photo polymerization nature constituent containing a compound which has the structure denoted by following general formula (I), and a photopolymerization initiator.

[Chemical formula 1]

(X¹ expresses a hetero atom or a halogen atom among general formula (I).) R^a and R^b express respectively independently a hydrogen atom, a halogen atom, a cyano group, or an organic residue. R^a, R^b and X¹, R^a, or R^b may combine with each other, and may form annular structure.

[Detailed Description of the Invention]**[0001]**

[Field of the Invention]This invention relates to the photo polymerization nature material which can be used for optical hardening resin material uses, such as image formation materials and ink, such as three-dimensional Mitsuzo type, holography and the version material for the common version printing, a color proof, photoresist, and a color filter, a paint, adhesives. It is related with the photo polymerization nature constituent which engraves directly using various laser from digital signals, such as a computer, especially and which is suitably used as version material for the common version printing in which what is called direct plate making is possible.

[0002]

[Description of the Prior Art] The solid-state laser and semiconductor laser which emit purple outdoor daylight with a wavelength of 300 nm - 1200 nm, visible light, and infrared light, A high-output and small thing can obtain a gas laser now easily, and these laser is very useful as a record light source at the time of engraving directly from digital data, such as a computer. Many things are studied about the recording material which induces these various laser beams, and, [as a typical thing] As a material recordable with infrared laser with a sensitization wavelength of not less than 760 nm in the first place, there are a positive type recording material given in US,4708925,B, an acid catalyst bridge construction type negative type recording material indicated to JP,H8-276558,A, etc. A large number [the radical polymerization type negative type recording material etc. which are indicated to the second at a U.S. Pat. No. 2850445 item and JP,44-20189,B as a recording material of type corresponding to purple outdoor daylight (300 nm - 700 nm) or visible light laser].

[0003] It is important as a photoresist material, especially concerning short wavelength light and an electron beam of 300 nm or less on the other hand. in recent years, an integrated circuit raises the degree of location increasingly, and manufacture of semiconductor substrates, such as very large scale integration, also consists of line width below a half micron -- processing of a detailed pattern overly being needed and, in order to fulfill the necessity, it shortwave-izes increasingly, and **** outdoor daylight and excimer laser lights (XeCl, KrF, ArF, etc.) are examined, and also the operating wavelength of the exposure device used for photo lithography is based on an electron beam -- formation of a detailed pattern has overly come to be considered Promising [of especially the electron beam] is carried out as a light source of next-generation pattern formation art, and it is carried out.

[0004] Or ON-OFF of the picture is [how] expandable in various above-mentioned energy irradiation parts and non-irradiation part as SUBJECT common to all such image formation materials, it is, that is, it is coexistence of the high sensitivity of image formation material, and preservation stability. Usually, although an optical radical polymerization system is high sensitivity, it is greatly formed into low sensitivity by the polymerization prevention by oxygen in the air. Therefore, means to provide the layer of oxygen interception nature on an image formation layer are taken. However, if the layer of oxygen interception nature is provided, KABURI by dark polymerization etc. will occur conversely and preservation stability will get worse. Therefore, coexistence of high sensitivity and preservation stability is difficult SUBJECT.

The result it can fully be satisfied with a Prior art of the result was not obtained, but the new art which is not in the former was searched for.

[0005]

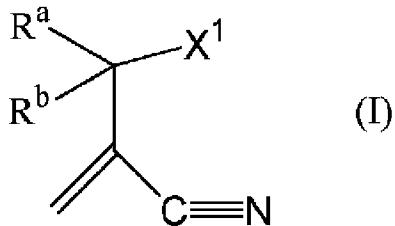
[Problem to be solved by the invention]Therefore, the purpose of this invention is to provide a photo polymerization nature constituent splendidly compatible in the preservation stability which was most excellent in high sensitivity with high sensitivity in the optical radical polymerization system constituent by which promising ** is carried out also in image formation art. It is providing a photo polymerization nature constituent suitable as version material for monotonous printing which can be engraved directly from digital data, such as a computer, by recording using the solid-state laser which emits purple outdoor daylight, visible light, and infrared light especially, and semiconductor laser light.

[0006]

[Means for solving problem]This invention persons found out attaining the above-mentioned purpose by using the compound which has a specific polymerization nature machine in a photo polymerization nature constituent, as a result of inquiring wholeheartedly. That is, this invention has the following composition. The photo polymerization nature constituent containing the compound which has the structure denoted by following general formula (I), and a photopolymerization initiator.

[0007]

[Chemical formula 2]



[0008](X¹ expresses a hetero atom or a halogen atom among general formula (I).) R^a and R^b express respectively independently a hydrogen atom, a halogen atom, a cyano group, or an organic residue. R^a, R^b and X¹, R^a, or R^b may combine with each other, and may form annular structure.

[0009]Although the monomer which has an acrylic ester machine with high polymerization nature, an acrylic acid amide machine, a methacrylate ester machine, a methacrylic acid amide machine, etc. as a compound of the most general radical polymerization nature from the former, oligomer, polymer, etc. are used, In these things, since the polymerization prevention by oxygen is received, when it uses for a photo polymerization nature constituent, SUBJECT called coexistence of sensitivity and preservation stability cannot be attained.

[0010]The compound (monomer) which has alpha-hetero substitution methyl acrylics machine and alpha-halogen substitution methyl acrylics machine as a basis which, on the other hand, has the polymerization nature which is equal to acrylic as a composition ingredient of polymer

is known. It is said that the polymerization nature of these compounds as a composition ingredient of polymer improves according to the electronic effects and the three-dimensional effect of a hetero atom or a halogen atom which differed from each other in the low itaconic acid machine of the polymerization nature which has a substituent at least in the same alpha, alpha-ARUKIRU acrylics machine, etc., and were replaced at least by alpha.

[0011][this invention person] [by using for a photo polymerization nature constituent the compound containing the structure of having the polymerization nature machine which the hetero atom or the halogen atom replaced at least by alpha, with a photopolymerization initiator] The influence of polymerization prevention of SUBJECT which the conventional radical polymerization nature compound has, i.e., above-mentioned oxygen, could be reduced sharply, and it found out that the high sensitivity which is SUBJECT peculiar to the above-mentioned photo polymerization nature constituent, and the outstanding coexistence of preservation stability are solvable. Although the mechanism in which the influence of polymerization prevention of oxygen is reduced is not clear, [the compound which has the structure denoted by general formula (I) in this invention] It is thought that it is hard to react to oxygen at the time of chain propagation, and becomes difficult to be affected according to the substituent effect like the alpha-as a result by the influence of polymerization prevention of oxygen since the stop kinetic constant is extremely small although a polymerization propagation rate constant is not so high as compared with the conventional acrylic or an methacrylic system.

[0012]

[Mode for carrying out the invention]The compound of the feature in <compound which has structure shown by general formula (I) in this invention> this invention is a compound which has the structure denoted by general formula (I), and has at least one polymerization nature machine. The structure shown by general formula (I) may serve as a substituent more than univalent or divalent, and all of R^a in general formula (I), R^b , and X^1 may express an end group, and it may become one compound by itself. When the structure shown by general formula (I) serves as a substituent more than univalent or divalent, at least one of R^a in general formula (I), R^b , and X^1 has one or more joint hands. X^1 could become a connection machine which has a part which can connect n pieces, and may connect n bases shown in the end by general formula (I) (polymer (n is an integer greater than or equal to 2)). It may combine with the polymer chain by X^1 . That is, the form in which the structure denoted by the side chain of a polymer chain by general formula (I) exists may be taken. Here, as a polymer chain, the below-mentioned line organicity high molecular weight polymer is mentioned. Specifically, vinyl system polymers, such as polyurethane, novolac, and polyvinyl alcohol, poly HIDOROSHI styrene, polystyrene, poly(meta) acrylic ester, poly(meta) acrylic acid amide, PORIASE tar, etc.

are mentioned. A homopolymer or a copolymer (copolymer) may be sufficient as these polymers. In this general formula (I), although X^1 expresses a hetero atom or a halogen atom, they may become an end group, and it becomes a connection machine, and may be connected with other substituents (as a substituent, the structure and the polymer chain of general formula (I) are also included like **** here). As a hetero atom, it is a nonmetallic atom preferably, and an oxygen atom, a sulfur atom, a nitrogen atom, and a phosphorus atom are specifically mentioned. As a halogen atom, a chlorine atom, a bromine atom, an iodine atom, a fluorine atom, etc. are mentioned. [as a basis by which other substituents are connected preferably as X^1 there by a halogen atom or X^1 becoming a connection machine] A hydroxyl machine, a substitution OKISHI machine, a mercapto group, a substitution thio group, an amino group, A substitution amino group, a sulfonic group, a sulfonate group, a substitution sulfinyl group, a substitution sulfonyl group, a phosphono group, a substitution phosphono group, a HOSUHONATO machine, a substitution HOSUHONATO machine, a nitro group, and a hetero ring machine (however, it has connected with the hetero atom) are expressed.

[0013]When X^1 becomes a connection machine and it becomes the basis by which other substituents are connected there, except for n hydrogen, it could become a connection machine which has a part which can connect n pieces from those bases, and n bases of general formula (I) may be connected with the end (n is an integer greater than or equal to 2).

[0014] R^a and R^b become independent respectively and more preferably, The hydrocarbon group which may have a substituent and may include the unsaturated bond as a hydrogen atom, a halogen atom, a cyano group, or an organic residue, A substitution OKISHI machine, a substitution thio group, a substitution amino group, a substitution carbonyl group, and a carboxylate machine are expressed, and it may combine with each other and R^a and R^b may form annular structure.

[0015]Next, the example of each above-mentioned substituent in X^1 in general formula (I), R^a , and R^b is shown. As a hydrocarbon group which may have the above and a substituent and may include the unsaturated bond, an alkyl group, a substitution alkyl group, an aryl group, a substitution aryl group, an alkenyl group, a substitution alkenyl group, an alkynyl group, and a substitution alkynyl group are raised.

[0016]As an alkyl group, the number of carbon atoms can raise the straight chain shape from 1 to 20, the letter of branching, or an annular alkyl group, and it, [as the example] A methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a hexyl group, A heptyl group, an octyl group, a nonyl group, a decyl group, the Ung decyl group, a dodecyl group, A tridecyl machine, a hexadecyl machine, an octadecyl group, an eicosyl machine, an isopropyl group, An isobutyl machine, s-butyl group, t-butyl group, an iso pentyl group, a neopentyl machine, 1-methylbutyl machine, an iso hexyl group, a 2-ethylhexyl machine, 2-methylhexyl

machine, a cyclohexyl group, a cyclopentylic group, and 2-norbornyl machine can be raised. In these, the annular alkyl group to the straight chain shape to 1-12 carbon atom, the letter of branching to 3-12 carbon atom, and 5-10 carbon atom is more preferred.

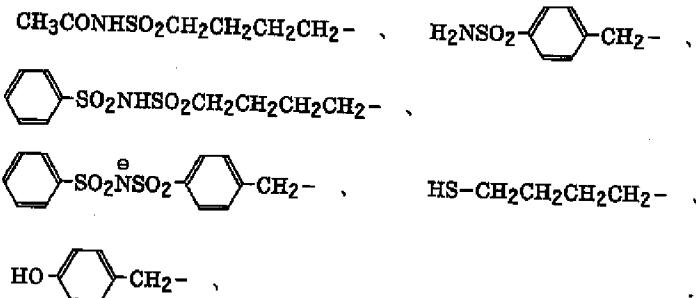
[0017]A substitution alkyl group is constituted by combination with a substituent and an alkylene machine, and, [as the substituent] He is used by the nonmetallic atom group of the 1 value except hydrogen, and, [as a desirable example] A halogen atom (-F, -Br, -Cl, -I), a hydroxyl machine, an alkoxy group, An aryloxy machine, a mercapto group, an alkylthio group, an arylthio group, An ARUKIRU dithio machine, an ARIRU dithio machine, an amino group, N-alkylamino group, An N and N-dialkylamino group, N-arylamino machine, N, and N-diaryl amino group, An N-Al ****- N-arylamino machine, a reed RUOKISHI machine, a carbamoyloxy machine, N-ARUKIRU carbamoyloxy machine, N-ARIRU carbamoyloxy machine, An N and N-JIARU kill carbamoyloxy machine, N, and N-diaryl carbamoyloxy machine, An N-Al ****- N-ARIRU carbamoyloxy machine, an ARUKIRU sulfoxyl machine, An ARIRU sulfoxyl machine, a reed RUCHIO machine, the acylamino machine, N-ARUKIRU acylamino machine, An N-ARIRU acylamino machine, UREIDO machine, N'-ARUKIRUU RAID machine, N', and N'-JIARUKIRUU RAID machine, N'-aryl ureide machine, N', and N'-diaryl RAID machine, an N'-Al ****- N'-aryl ureide machine, N-ARUKIRUU RAID machine, N-aryl ureide machine, an N'-Al ****- N-ARUKIRUU RAID machine, An N'-Al ****- N-aryl ureide machine, N', and N'-Zia *****- N-ARUKIRUU RAID machine, An N' and N'-Zia *****- N-aryl ureide machine, an N'-Ally Lu N-ARUKIRUU RAID machine, An N'-Ally Lu N-aryl ureide machine, N', and N'-diaryl N-ARUKIRUU RAID machine, An N' and N'-diaryl N-aryl ureide machine, an N'-Al ****- N'-Ally Lu N-ARUKIRUU RAID machine, An N'-Al ****- N'-Ally Lu N-aryl ureide machine, an alkoxy carbonyl amino machine, An aryloxy carbonyl amino machine, an N-Al ****- N-alkoxy carbonyl amino machine, An N-Al ****- N-aryloxy carbonyl amino machine, an N-Ally Lu N-alkoxy carbonyl amino machine, An N-Ally Lu N-aryloxy carbonyl amino machine, a formyl group, Acyl group, carboxyl group and its conjugate base machine (carboxylate is called hereafter), alkoxy carbonyl group, aryloxy carbonyl group, carbamoyl group, N-ARUKIRU carbamoyl group, N, and N-JIARU kill carbamoyl group, An N-Al ****- N-Ally Luca Luba Moyle machine, N, and N-diaryl carbamoyl group, An N-Al ****- N-Ally Luca Luba Moyle machine, an ARUKIRU sulfinyl group, An ARIRU sulfinyl group, an ARUKIRU sulfonyl group, an ARIRU sulfonyl group, A sulfonic group (-SO₃H) and its conjugate base machine (a sulfonate group is called hereafter), An alkoxy sulfonyl group, an aryloxy sulfonyl group, a SURUFINAMOIRU machine, N-ARUKIRUSURUFINAMOIRU machine, N, and N-JIARUKIRUSURUFINAMOIRU machine, N-ARIRUSURUFINAMOIRU machine, a N,N-diarylsulfamoyl group, An N-Al ****- N-ARIRUSURUFINAMOIRU machine, a sulfamoyl group, N-ARUKIRU sulfamoyl group, N, and N-JIARU kill sulfamoyl group, N-arylsulfamoyl group, an N,N-diaryl sulfamoyl machine, An N-Al ****- N-arylsulfamoyl group, N-ASHIRU sulfamoyl group, and its conjugate base machine, N-

ARUKIRU sulfo nil sulfamoyl group (-SO₂NHSO₂ (alkyl)) and its conjugate base machine, N-ARIRU sulfo nil sulfamoyl group (-SO₂NHSO₂ (allyl)), and its conjugate base machine, N-ARUKIRU sulfo nil carbamoyl group (-CONHSO₂ (alkyl)) and its conjugate base machine, N-ARIRU sulfo nil carbamoyl group (-CONHSO₂ (allyl)) and its conjugate base machine, An alkoxy silyl group (-Si(Oalkyl)₃), an aryloxy silyl group (-Si(Oallyl)₃), A hydroxy silyl group (-Si(OH)₃) and its conjugate base machine, A phosphono group (-PO₃H₂) and its conjugate base machine (a HOSUHONATO machine is called hereafter), A JIARU kill phosphono machine (-PO₃(alkyl)₂), a diallylphosphono group (-PO₃(aryl)₂), An alkyl aryl phosphono machine (-PO₃(alkyl)(aryl)), A monoalkyl phosphono machine (-PO₃H (alkyl)) and its conjugate base machine (henceforth) The MONOA reel phosphono machine (-PO₃H (aryl)) called an ARUKIRUHOSUHONATO machine, the conjugate base machine (an ARIRUHOSUHONATO machine is called henceforth) and a phosphonooxy machine (-OPO₃H₂), and its conjugate base machine (a phospho NATOOKISHI machine is called henceforth), A JIARU kill phosphonooxy machine (-OPO₃(alkyl)₂), A diaryl phosphonooxy machine (-OPO₃(aryl)₂), An alkyl aryl phosphonooxy machine (-OPO₃(alkyl)(aryl)), A monoalkyl phosphonooxy machine (-OPO₃H (alkyl)) and its conjugate base machine (henceforth) The MONOA reel phosphonooxy machine (-OPO₃H (aryl)) called an ARUKIRUHOSUHONATOOKISHI machine and the conjugate base machine (an ARIRUHOSUHONATOOKISHI machine is called henceforth) and a cyano group, a nitro group, an aryl group, an alkenyl group, and an alkynyl group are raised. [0018][as an example of an alkyl group in these substituents] It is raised by the above-mentioned alkyl group and, [as an example of an aryl group] A phenyl group, a biphenyl machine, a naphthyl group, a trill machine, a KISHIRIRU machine, a MESHICHIRU machine, A cumenyl machine, a fluoro phenyl group, a chlorophenyl machine, a bromo phenyl group, A chloromethyl phenyl group, a hydroxyphenyl machine, a methoxyphenyl machine, An ethoxy phenyl group, a phenoxyphenyl machine, an acetoxyphenyl machine, A benzoyloxy phenyl group, a methyl thiophenyl machine, a phenylthiophenyl machine, A methylamino phenyl group, a dimethylaminophenyl machine, an acetylamino phenyl group, A carboxyphenyl machine, a methoxy carbonylphenyl machine, an ethoxycarbonyl phenyl group, A FENOKISHI carbonylphenyl machine, N-phenylcarbamoyl phenyl group, a phenyl group, a nitrophenyl group, a cyanophenyl machine, a sulfophenyl machine, a sulfonate phenyl group, a phosphono phenyl group, a HOSUHONATO phenyl group, etc. can be raised. As an example of an alkenyl group, they are raised by a vinyl group, 1-propenyl machine, 1-but enyl group, a SHINNAMIRU machine, 2-chloro 1-ethenyl machine, etc., and, [as an example of an alkynyl group] An

ethynyl group, 1-propynyl machine, 1-butynyl machine, a trimethylsilyl ethynyl group, a phenyl ethynyl group, etc. are raised.

[0019] As an above-mentioned acyl group (R4CO-), R4 can raise a hydrogen atom and the above-mentioned alkyl group, an aryl group, an alkenyl group, and an alkynyl group. On the other hand as an alkylene machine in a substitution alkyl group, any one of the hydrogen atoms on the alkyl group to the above-mentioned carbon numbers 1-20 is **(ed), What was made into the divalent organic residue can be raised, and the desirable annular alkylene machine to the straight chain shape to 1-12 carbon atom, the letter of branching to 3-12 carbon atom, and 5-10 carbon atom can be raised. As an example of a desirable substitution alkyl group, a chloromethyl group, a bromomethyl machine, 2-chloro ethyl group, a trifluoromethyl group, a methoxymethyl machine, a methoxy ethoxyethyl machine, An aryloxymethyl machine, a phenoxyethyl machine, a methyl thiomethyl machine, A trill thiomethyl machine, an ethylamino ethyl group, a diethylamino propyl group, A morpholino propyl group, an acetoxy methyl group, a benzoyl oxymethyl machine, N-cyclohexylcarbamoyloxy ethyl group, N-phenylcarbamoyloxy ethyl group, An acetylamino ethyl group, N-methylbenzoyl aminopropyl machine, A 2-oxo ethyl group, a 2-oxo propyl group, a carboxypropyl machine, A methoxy carbonylethyl machine, a methoxy carbonylmethyl machine, a methoxy carbonyl butyl group, An ethoxy carbonylmethyl machine, a butoxy carbonylmethyl machine, an allyloxy carbonylmethyl machine, A benzyloxy carbonylmethyl machine, a methoxy carbonyl phenylmethyl machine, a trichloromethyl carbonylmethyl machine, an allyloxy carbonyl butyl group, a chloro FENOKISHI carbonylmethyl machine, the Culver Moyle methyl group, N-methylcarbamoyl ethyl group, N and N-JIPUROPIRUKARUBAMO ylmethyl machine, N-(methoxyphenyl) Culver Moyle ethyl group, An N-methyl N-(sulfophenyl) Culver Moyle methyl group, a sulfopropyl machine, Sulfo butyl group, sulfonate butyl group, sulfamoyl butyl group, N-ethyl sulfamoyl methyl group, N, and N-JIPURO pill sulfamoyl propyl group, N-trill sulfamoyl propyl group, an N-methyl N-(phosphono phenyl) sulfamoyl octyl group, [0020]

[Chemical formula 3]



[0021] A phosphono butyl group, a HOSUHONATO hexyl group, a JIECHIRU phosphono butyl group, A diphenyl phosphono propyl group, a methyl phosphono butyl group, a methyl phospho NATOBUCHIRU machine, A trill phosphono hexyl group, a trill HOSUHONATO hexyl

group, a phosphonoxy propyl group, A phospho NATOOKISHI butyl group, a benzyl group, a FENECHIRU machine, alpha-methylbenzyl machine, A 1-methyl 1-phenylethyl machine, p-methylbenzyl machine, a SHINNAMIRU machine, an allyl group, 1-propenyl methyl group, 2-butenyl group, 2-methyl allyl group, 2-methyl propenyl methyl group, 2-propynyl group, 2-butynyl machine, 3-butynyl machine, etc. can be raised.

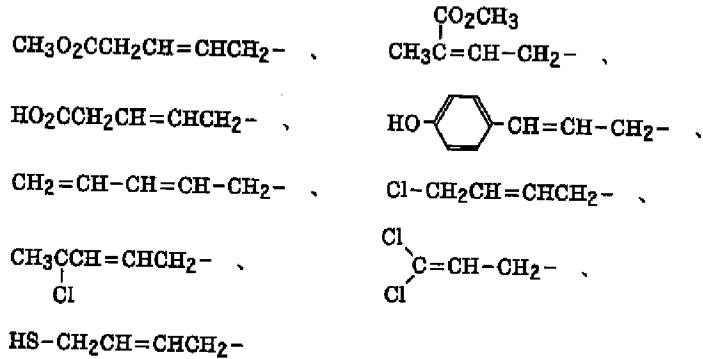
[0022]As an aryl group, 1 to three benzene rings can raise the thing in which the condensed ring was formed, and the thing in which the benzene ring and 5 member unsaturated ring formed the condensed ring, and them, [as an example] A phenyl group, a naphthyl group, an anthryl group, a phenan trill machine, an indenyl group, an ASENA butenyl group, and a fluorenlyl group can be raised, and a phenyl group and a naphthyl group are more preferred in these.

[0023]A substituent combines a substitution aryl group with an aryl group, and what has a nonmetallic atom group of the 1 value except hydrogen as a substituent on the ring formation carbon atom of the above-mentioned aryl group is used. As an example of a desirable substituent, the above-mentioned alkyl group, a substitution alkyl group, and the thing previously shown as a substituent in a substitution alkyl group can be raised. [as a desirable example of these substitution aryl groups] A biphenyl machine, a trill machine, a KISHIRIRU machine, a MESHICHIRU machine, a cumenyl machine, a chlorophenyl machine, A bromophenyl group, a fluoro phenyl group, a chloromethyl phenyl group, A trifluoro methylphenyl machine, a hydroxyphenyl machine, a methoxyphenyl machine, A methoxyethoxy phenyl group, an allyloxy phenyl group, a phenoxyphenyl machine, A methyl thiophenyl machine, a trill thiophenyl machine, a phenylthiophenyl machine, An ethylamino phenyl group, a diethylaminophenyl machine, a morpholinophenyl machine, An acetoxyphenyl group, a benzoxyloxy phenyl group, N-cyclohexylcarbamoyloxy phenyl group, N-phenylcarbamoyloxy phenyl group, an acetylamino phenyl group, N-methylbenzoyl aminophenyl machine, a carboxyphenyl machine, a methoxy carbonylphenyl machine, Allyloxy carbonylphenyl machine, chloro FENOKISHI carbonylphenyl machine, Culver Moyle phenyl group, N-methylcarbamoyl phenyl group, N, and N-JIPUROPIRUKARUBAMOIRU phenyl group, N-(methoxyphenyl) Culver Moyle phenyl group, An N-methyl N-(sulfophenyl) Culver Moyle phenyl group, a sulfophenyl machine, A sulfonate phenyl group, a sulfamoyl phenyl group, N-ethyl sulfamoyl phenyl group, N and N-JIPURO pill sulfamoyl phenyl group, N-trill sulfamoyl phenyl group, An N-methyl N-(phosphono phenyl) sulfamoyl phenyl group, A phosphono phenyl group, a HOSUHONATO phenyl group, a JIECHIRU phosphono phenyl group, A diphenyl phosphono phenyl group, a methyl phosphono phenyl group, a methyl HOSUHONATO phenyl group, A trill phosphono phenyl group, a trill HOSUHONATO phenyl group, an allyl group, 1-propenyl methyl group, 2-butenyl group, 2-methyl ARIRU phenyl group, 2-methyl propenylphenyl machine, 2-propynyl phenyl group, 2-butynyl phenyl group, 3-butynyl phenyl

group, etc. can be raised.

[0024] An above-mentioned thing can be mentioned as an alkenyl group. A substituent replaces the hydrogen atom of an alkenyl group, a substitution alkenyl group joins together, the substituent in an above-mentioned substitution alkyl group is used as this substituent, and, on the other hand, the alkenyl group can use an above-mentioned alkenyl group. As the example of a desirable substitution alkenyl group [0025]

[Chemical formula 4]

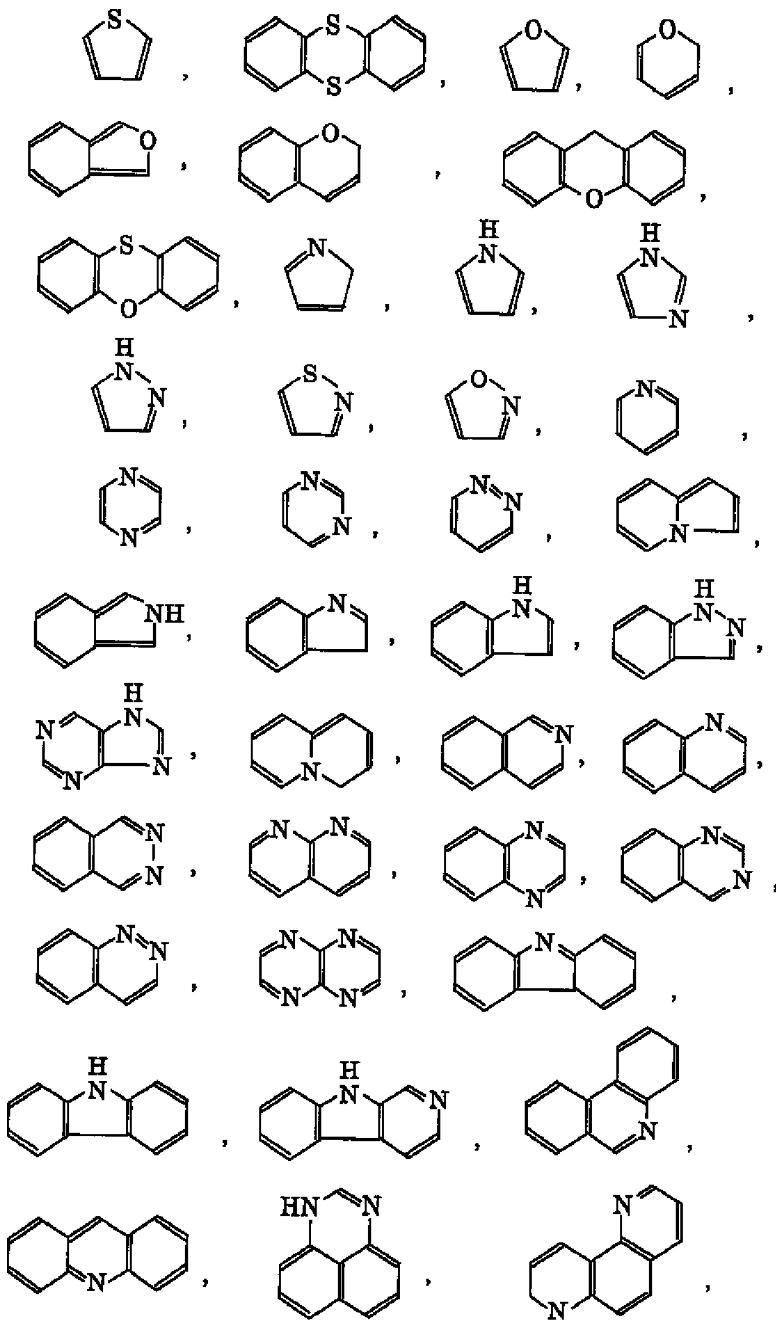


[0026]** can be raised. An above-mentioned thing can be mentioned as an alkynyl group. A substituent replaces the hydrogen atom of an alkynyl group, and combines a substitution alkynyl group, the substituent in an above-mentioned substitution alkyl group is used as this substituent, and, on the other hand, the alkynyl group can use an above-mentioned alkynyl group.

[0027] A hetero ring machine is a basis (substitution hetero ring machine) of the 1 value which one hydrogen was **(ed) further, and the substituent in an above-mentioned substitution alkyl group joined together, and was made from the basis of the 1 value which **(ed) one hydrogen on a hetero ring, and the basis of this 1 value. As the example of a desirable hetero ring,

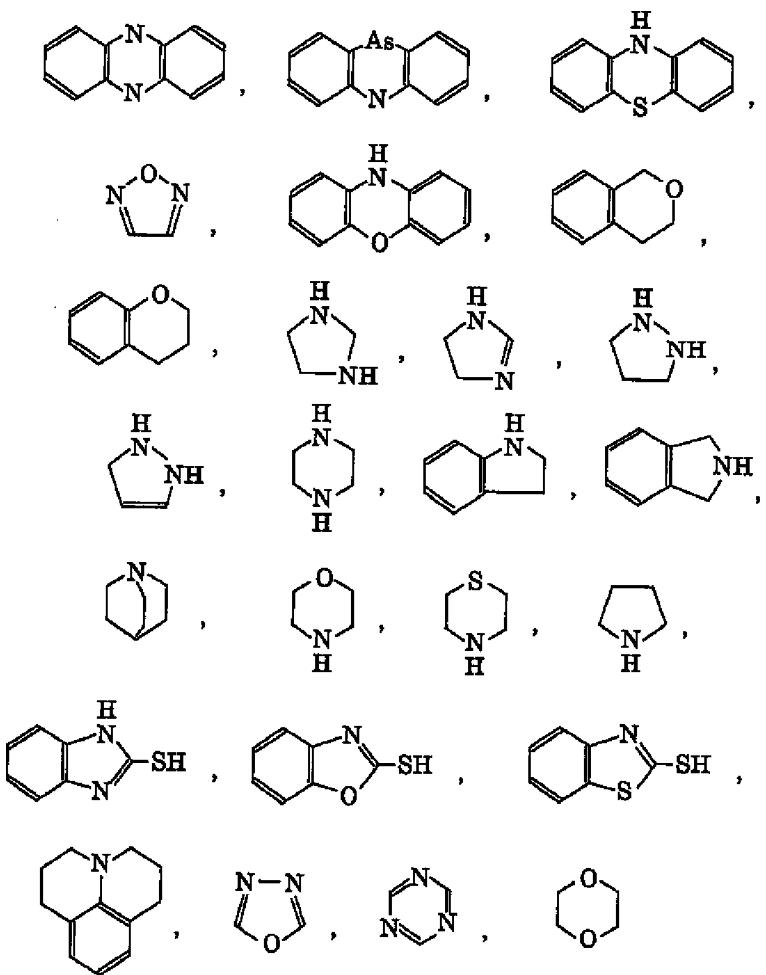
[0028]

[Chemical formula 5]



[0029]

[Chemical formula 6]



[0030]** can be raised.

[0031]As a substitution OKISHI machine (R5O-), R5 can use what is a nonmetallic atom group of the 1 value except hydrogen. As a desirable substitution OKISHI machine, an alkoxy group, an aryloxy machine, a reed RUOKISHI machine, A carbamoyloxy machine, N-ARUKIRU carbamoyloxy machine, N-ARIRU carbamoyloxy machine, An N and N-JIARU kill carbamoyloxy machine, N, and N-diaryl carbamoyloxy machine, an N-Al ****- N-ARIRU carbamoyloxy machine, an ARUKIRU sulfoxy machine, an ARIRU sulfoxy machine, a phosphonooxy machine, and a phospho NATOOKISHI machine can be raised. What was shown as the alkyl group in these and an aryl group as the above-mentioned alkyl group, a substitution alkyl group and an aryl group, and a substitution aryl group can be raised. As an acyl group (R6CO-) in a reed RUOKISHI machine, R6 can raise the thing of the above-mentioned alkyl group, a substitution alkyl group, an aryl group, and a substitution aryl group. In these substituents, it is more desirable than an alkoxy group, an aryloxy machine, a reed RUOKISHI machine, an ARIRU sulfoxy machine, and **. As an example of a desirable substitution OKISHI machine, a methoxy group, an ethoxy basis, A propyloxy machine, an isopropyloxy machine, a butyloxy machine, a pentyloxy machine, A hexyloxy machine, a

dodecyloxy machine, a benzyloxy group, an allyloxy machine, A phenethyloxy machine, a carboxyethyl OKISHI machine, a methoxy carbonyl ethyloxy machine, An ethoxycarbonyl ethyloxy machine, a methoxyethoxy machine, a FENOKISHI ethoxy basis, A methoxyethoxy ethoxy basis, an ethoxy ethoxy ethoxy basis, a morpholino ethoxy basis, A morpholino propyloxy machine, an allyloxy ethoxy ethoxy basis, a phenoxy group, A tolyloxy machine, a KISHIRIRUOKISHI machine, a MESHICHIRUOKISHI machine, a cumenyl OKISHI machine, A methoxyphenyloxy machine, an ethoxyphenyloxy machine, a chloro phenyloxy machine, a bromo phenyloxy machine, an acetyloxy machine, a benzyloxy machine, a naphthylloxy machine, a phenylsulfonyloxy machine, a phosphonoxy machine, phospho NATOOKISHI, etc. are mentioned.

[0032]As a substitution thio group (R7S-), R7 can use the thing of the nonmetallic atom group of the 1 value except hydrogen. As an example of a desirable substitution thio group, an alkylthio group, an arylthio group, an ARUKIRU dithio machine, an ARIRU dithio machine, and a reed RUCHIO machine can be raised. Being able to raise what was shown as the alkyl group in these, and an aryl group as the above-mentioned alkyl group, a substitution alkyl group and an aryl group, and a substitution aryl group, R6 of the acyl group (R6CO-) in a reed RUCHIO machine is as above-mentioned. In these, an alkylthio group and an arylthio group are more preferred. As an example of a desirable substitution thio group, a methylthio group, an ethyl thio group, a phenylthio group, an ethoxyethyl thio group, a carboxyethyl thio group, a methoxy carbonyl thio group, etc. are raised.

[0033]As a substitution amino group (R8NH-, N(R(R9) 10)-), R8, R9, and R10 can use the thing of the nonmetallic atom group of the 1 value except hydrogen. As a desirable example of a substitution amino group, N-alkylamino group, N, and N-dialkylamino group, An N-arylamino machine, N, and N-diaryl amino group, an N-Al ****- N-arylamino machine, The acylamino machine, N-ARUKIRU acylamino machine, N-ARIRU acylamino machine, A UREIDO machine, N'-ARUKIRUU RAID machine, N', and N'-JIARUKIRUU RAID machine, An N'-aryl ureide machine, N', and N'-diaryl RAID machine, an N'-Al ****- N'-aryl ureide machine, N-ARUKIRUU RAID machine, N-arylamino machine, an N'-Al ****- N-ARUKIRUU RAID machine, An N'-Al ****- N-aryl ureide machine, N', and N'-Zia *****- N-ARUKIRUU RAID machine, An N' and N'-Zia *****- N-aryl ureide machine, an N'-Ally Lu N-ARUKIRUU RAID machine, An N'-Ally Lu N-aryl ureide machine, N', and N'-diaryl N-ARUKIRUU RAID machine, An N' and N'-diaryl N-aryl ureide machine, an N'-Al ****- N'-Ally Lu N-ARUKIRUU RAID machine, an N'-Al ****- N'-Ally Lu N-aryl ureide machine, an alkoxycarbonylamino machine, an aryloxy carbonylamino machine, An N-Al ****- N-alkoxycarbonylamino machine, an N-Al ****- N-aryloxy carbonylamino machine, an N-Ally Lu N-alkoxycarbonylamino machine, and an N-Ally Lu N-aryloxy carbonylamino machine are raised. The alkyl group in these, the above-mentioned alkyl group as an aryl group, Being able to raise what was shown as a substitution

alkyl group and an aryl group, and a substitution aryl group, R6 of the acyl group (R6CO-) in the acylamino machine, N-ARUKIRU acylamino machine, and N-ARIRU acylamino machine is as above-mentioned. As an among these more desirable thing, they are N-alkylamino group, N, and N-dialkylamino group, N-arylamino machine, the acylamino machine, and *****. As an example of a desirable substitution amino group, a methylamino machine, an ethylamino machine, a diethylamino machine, a morpholino group, a piperidino machine, a pyrrolidino machine, a phenylamino machine, a benzoylamino machine, an acetylamino machine, etc. are raised.

[0034]As a substitution carbonyl group (R11-CO-), R11 can use the thing of the nonmetallic atom group of 1 value. As a desirable example of a substitution carbonyl group, a formyl group, an acyl group, a carboxyl group, An alkoxy carbonyl group, aryloxy carbonyl group, carbamoyl group, N-ARUKIRU carbamoyl group, N, and N-JIARU kill carbamoyl group, N-Ali Luca Luba Moyle machine, N, and N-diaryl carbamoyl group and an N-AI ****- N-Ali Luca Luba Moyle machine are raised. What was shown as the alkyl group in these and an aryl group as the above-mentioned alkyl group, a substitution alkyl group and an aryl group, and a substitution aryl group can be raised. [as an among these more desirable substitution carbonyl group] A formyl group, an acyl group, a carboxyl group, an alkoxy carbonyl group, An aryloxy carbonyl group, a carbamoyl group, N-ARUKIRU carbamoyl group, As N and N-JIARU kill carbamoyl group, N-Ali Luca Luba Moyle machine, ***** , and a further more desirable thing, a formyl group, an acyl group, an alkoxy carbonyl group, and an aryloxy carbonyl group are raised. [as an example of a desirable substitution carbonyl group] Formyl group, acetyl group, benzoyl group, carboxyl group, methoxy carbonyl group, and allyloxy carbonyl group, N-methyl carbamoyl machine, N-phenyl carbamoyl machine, N, and N-diethyl carbamoyl machine, a morpholino carbonyl machine, etc. are raised.

[0035]As a substitution sulfinyl group (R12-SO-), R12 can use the thing of the nonmetallic atom group of 1 value. As a desirable example, an ARUKIRU sulfinyl group, an ARIRU sulfinyl group, SURUFINAMOIRU machine, N-ARUKIRUSURUFINAMOIRU machine, N, and N-JIARUKIRUSURUFINAMOIRU machine, N-ARIRUSURUFINAMOIRU machine, a N,N-diarylsulfinamoyl group, and an N-AI ****- N-ARIRUSURUFINAMOIRU machine are raised. What was shown as the alkyl group in these and an aryl group as the above-mentioned alkyl group, a substitution alkyl group and an aryl group, and a substitution aryl group can be raised. As an among these more desirable example, they are an ARUKIRU sulfinyl group, an ARIRU sulfinyl group, and *****. As an example of such a substitution sulfinyl group, it passes and a KISHIRU sulfinyl group, the Ben Jill sulfinyl group, a trill sulfinyl group, etc. are raised.

[0036]As a substitution sulfonyl group (R13-SO₂-), R13 can use the thing of the nonmetallic atom group of 1 value. As a more desirable example, an ARUKIRU sulfonyl group and an ARIRU sulfonyl group can be raised. What was shown as the alkyl group in these and an aryl

group as the above-mentioned alkyl group, a substitution alkyl group and an aryl group, and a substitution aryl group can be raised. As such an example of a substitution sulfonyl group, a butyl sulfonyl group, a chlorophenyl sulfonyl group, etc. are raised.

[0037]As for a sulfonate group (-SO_3^-), it is preferred as above-mentioned to mean the conjugate base negative ion machine of a sulfonic group ($\text{-SO}_3\text{H}$), and to usually be used with an opposite positive ion. As such an opposite positive ion, the thing generally known, such as ammonium, sulfonium, phosphonium, iodonium, and horse mackerel NIUMU, i.e., onium [various], and metal ions (Na^+ , K^+ , Ca^{2+} , Zn^{2+} , etc.) are raised.

[0038]As for a carboxylate machine (-CO_2^-), it is preferred as above-mentioned to mean the conjugate base negative ion machine of a carboxyl group (CO_2H), and to usually be used with an opposite positive ion. As such an opposite positive ion, the thing generally known, such as ammonium, sulfonium, phosphonium, iodonium, and horse mackerel NIUMU, i.e., onium [various], and metal ions (Na^+ , K^+ , Ca^{2+} , Zn^{2+} , etc.) are raised.

[0039]A substitution phosphono group means what was replaced by one or the organic oxo group of others [two] of the hydroxyl group on a phosphono group, and, [as a desirable example] The above-mentioned JIARU kill phosphono machine, a diallylphosphono group, an alkyl aryl phosphono machine, a monoalkyl phosphono machine, and a MONOA reel phosphono machine are raised. In these, a JIARU kill phosphono machine and a diallylphosphono group are more preferred. As such an example, a JIECHIRU phosphono machine, a JIBUCHIRU phosphono machine, a diphenyl phosphono machine, etc. are raised.

[0040]A HOSUHONATO machine (-PO_3^{2-} , $\text{-PO}_3\text{H}^-$) means the conjugate base negative ion machine originating in the first dissociation of acid or the second dissociation of acid of a phosphono group ($\text{-PO}_3\text{H}_2$) as above-mentioned. Usually, being used with an opposite positive ion is preferred. what is generally known as such an opposite positive ion, i.e., onium [various], (ammonium.) Sulfonium, phosphonium, iodonium: Metal ions (Na^+ , K^+ , Ca^{2+} , Zn^{2+} , etc.), such as horse mackerel NIUMU, are raised.

[0041]A substitution HOSUHONATO machine is a hydroxyl group a conjugate base negative ion machine of what was replaced by the 1 organicity oxo group among the above-mentioned substitution phosphono groups, and, [as an example] The conjugate base of the above-mentioned monoalkyl phosphono machine ($\text{-PO}_3\text{H}$ (alkyl)) and a MONOA reel phosphono machine ($\text{-PO}_3\text{H}$ (aryl)) can be raised. Usually, being used with an opposite positive ion is preferred. what is generally known as such an opposite positive ion, i.e., onium [various], (ammonium.) Metal ions (Na^+ , K^+ , Ca^{2+} , Zn^{2+} , etc.), such as sulfonium, phosphonium,

iodonium, and horse mackerel NIUMU, are raised.

[0042] Next, the example of the annular structure which R^a , R^b or X^1 , R^a , or R^b combines mutually, and forms is shown. As a fatty series ring which R^a , R^b or X^1 , R^a , or R^b combines mutually, and forms, the fatty series ring of a five-membered ring, six membered-rings, seven membered-rings, and eight membered-rings can be raised, and the fatty series ring of a five-membered ring and six membered-rings can be raised more preferably. These may have a substituent further on the carbon atom which constitutes these (as an example of a substituent, the substituent on the above-mentioned substitution alkyl group can be raised), and some ring composition carbon may be replaced by hetero atoms (an oxygen atom, a sulfur atom, a nitrogen atom, etc.). A part of this fatty series ring may form a part of aromatic series ring. Next, the example of a compound of having the structure shown by general formula (I) is shown.

[0043]

[Table 1]

i) 单官能型

(A 群)

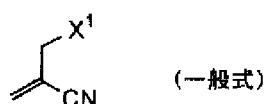


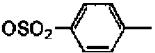
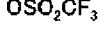
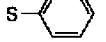
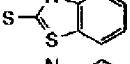
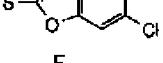
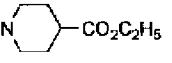
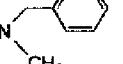
表-1

No.	X ¹
A-1	OH
A-2	OCH ₃
A-3	
A-4	O(n)C ₆ H ₁₃
A-5	
A-6	
A-7	
A-8	
A-9	
A-10	
A-11	OCOCH ₃
A-12	OCO(n)C ₆ H ₁₃
A-13	
A-14	
A-15	OSO ₂ (n)C ₆ H ₁₃

[0044]

[Table 2]

表-1(つづき)

No.	X ¹
A-16	
A-17	
A-18	
A-19	
A-20	
A-21	
A-22	
A-23	
A-24	
A-25	
A-26	
A-27	
A-28	
A-29	
A-30	
A-31	
A-32	

[0045]

[Table 3]

表-1(つづき)

No.	X ¹
A-33	
A-34	
A-35	
A-36	NHCOCH ₃
A-37	NHCO(n)C ₄ H ₉
A-38	
A-39	NHSO ₂ CH ₃
A-40	
A-41	OCOCH ₃
A-42	
A-43	
A-44	
A-45	
A-46	
A-47	NHCO ₂ (n)C ₈ H ₁₃
A-48	OCSNH(n)C ₄ H ₉

[0046]

[Table 4]

ii) 2官能型
(B群)

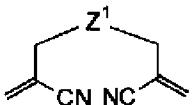


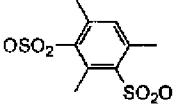
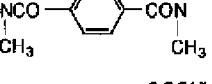
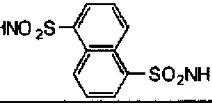
表-2

No.	Z¹
B-1	
B-2	
B-3	
B-4	
B-5	
B-6	
B-7	
B-8	
B-9	
B-10	
B-11	
B-12	
B-13	
B-14	

[0047]

[Table 5]

表-2(つづき)

No.	Z ¹
B-15	$\text{OSO}_2\sim\sim\sim\text{SO}_2\text{O}$
B-16	
B-17	$\text{OCO}\sim\sim\text{COO}\sim\sim\text{OCO}\sim\sim\text{COO}$
B-18	$\text{OCO}\sim\sim\text{CONH}\sim\sim\sim\text{NHCO}\sim\sim\text{COO}$
B-19	$\text{OCO}\sim\sim\text{CO}\left(\text{O}\sim\sim\text{OCO}-\text{C}_6\text{H}_4-\text{CO}\right)_{20}\text{OCO}\sim\sim\text{COO}$ (平均数)
B-20	$\text{OCO}\sim\sim\text{CONH}\sim\sim\sim\text{O}$
B-21	$\text{OCO}\sim\sim\sim\text{O}$
B-22	$\text{OCO}\sim\sim\sim\text{OCO}$
B-23	$\text{OCO}\sim\sim\text{OCO}$
B-24	$\text{OCO}\sim\sim\sim\text{OCO}$
B-25	$\text{OCO}\sim\sim\sim\text{OCO}$
B-26	$\text{S}\sim\sim\sim\text{S}$
B-27	$\text{NHCO}\sim\sim\sim\text{CONH}$
B-28	$\begin{array}{c} \text{N}\sim\sim\sim\text{N} \\ \\ \text{CH}_3 \end{array}$
B-29	
B-30	$\text{NHCOO}\sim\sim\sim\text{OCONH}$
B-31	

[0048]

[Table 6]

iii) 多官能型

(C 群)

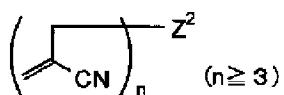


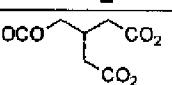
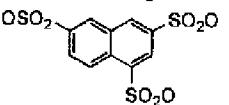
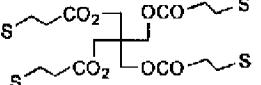
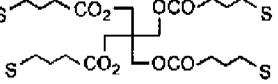
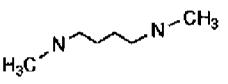
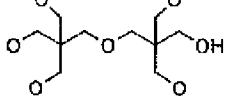
表-3

No.	Z^2
C-1	
C-2	
C-3	
C-4	
C-5	
C-6	
C-7	
C-8	
C-9	
C-10	

[0049]

[Table 7]

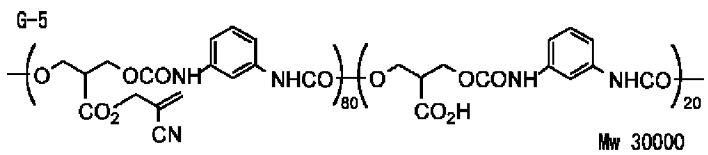
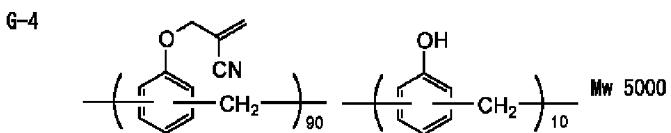
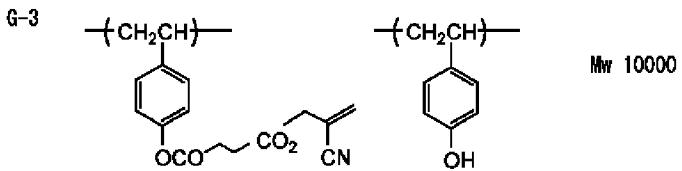
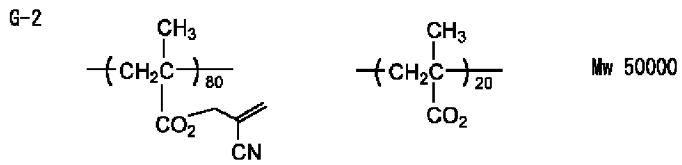
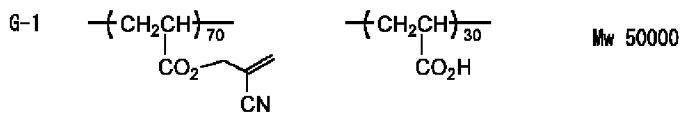
表-3(つづき)

No.	Z^2
C-11	
C-12	
C-13	
C-14	
C-15	
C-16	
C-17	
C-18	

[0050]

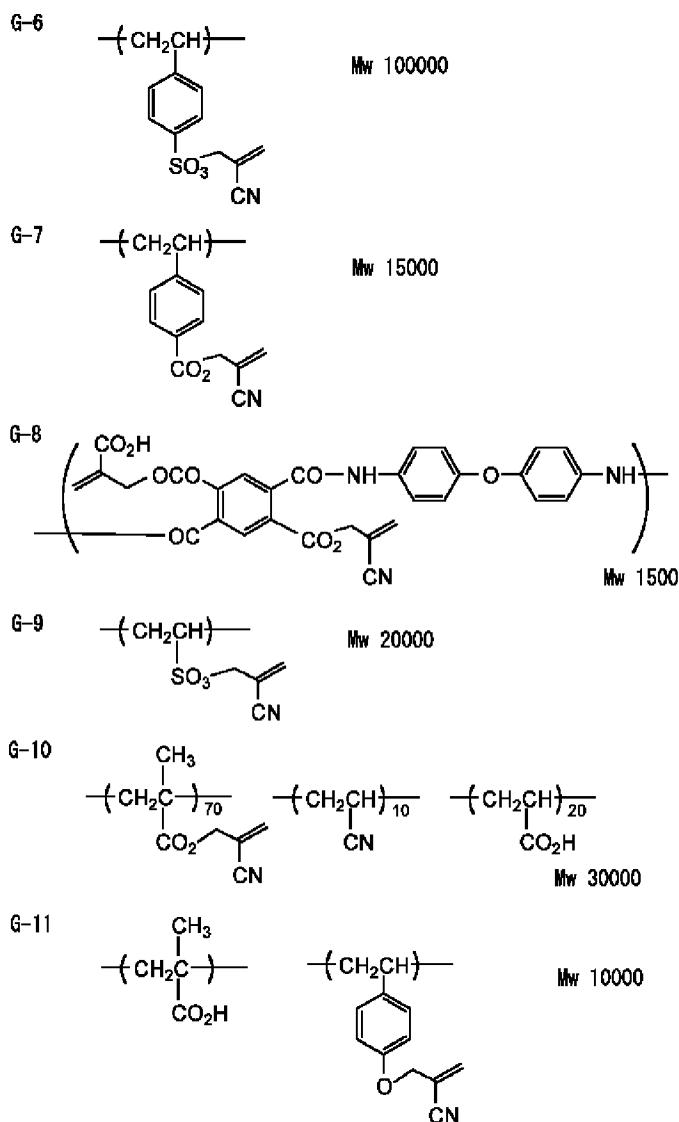
[Chemical formula 7]

iv) 高分子型 (G群)



[0051]

[Chemical formula 8]



[0052]the thing of a polyfunctional model (two or more organic functions and polymer type) which has two or more structures most preferably shown by general formula (I) in a molecule as a compound of this invention -- or, Many organic functions are contributed in the real photo polymerization having the basis of the structure shown by general formula (I) in a molecule, and other radical polymerization nature. The compound independent which have the structure shown by above general formula (I) as a compound which has an ethylenic unsaturated bond in which addition condensation is possible in the photo polymerization nature constituent of this invention, and two or more sorts of those mixtures, Or a mixture with the compound which has an ethylenic unsaturated bond which is described below, and in which publicly known addition condensation is conventionally possible is used. [as a compound which has an ethylenic unsaturated bond in which publicly known addition condensation is conventionally possible] For example, the ester of unsaturated carboxylic acid (for example, acrylic acid, methacrylic acid, itaconic acid, crotonic acid, isocrotonic acid, maleic acid, etc.) and an aliphatic

polyalcohol compound, the amide of the above-mentioned unsaturated carboxylic acid and an aliphatic polyamine compound, etc. are raised.

[0053][as an example of the monomer of the ester of an aliphatic polyalcohol compound and unsaturated carboxylic acid] As acrylic ester, ethylene glycol diacrylate, triethylene glycol diacrylate, 1, 3-butanediol diacrylate, tetramethylen glycol diacrylate, Propylene glycol diacrylate, neopentyl glycol diacrylate, Trimethylolpropane triacrylate, TORIMECHI roll propane bird (acryloyloxypropyl) ether, Trimethylol triacrylate, hexanediol diacrylate, 1, 4-cyclo hexanediol diacrylate, tetraethylene glycol diacrylate, PENTA erythritol diacrylate, PENTA erythritol bird acrylate, PENTA erythritol tetraacrylate, dipentaerythritol diacrylate, Dipentaerythritol hexaacrylate, sorbitol bird acrylate, sorbitol tetraacrylate, sorbitol pentaacrylate, sorbitol HEKISA acrylate, bird (acryloyloxyethyl) isocyanurate, There are polyester acrylate oligomer etc.

[0054]As methacrylate ester, tetramethylen glycol dimethacrylate, Triethylene glycol dimethacrylate, neopentyl glycol dimethacrylate, Trimethylolpropanetrimethacrylate, TORIMECHI roll ethane trimethacrylate, Ethylene glycol dimethacrylate, 1, 3-butanediol dimethacrylate, Hexanediol dimethacrylate, PENTA erythritol dimethacrylate, PENTA erythritol trimethacrylate, PENTA erythritol tetra-methacrylate, dipentaerythritol dimethacrylate, dipentaerythritol hexamethacrylate, sorbitol trimethacrylate, sorbitol tetra-methacrylate, a screw [p-(3-metacryloxy 2-hydroxy propoxy) phenyl] JIMECHIRU methane, ****- [p-(acrylics oxyethoxy) phenyl] There are JIMECHIRU methane etc. As itaconic acid ester, ethylene GURIKORUJI itaconate, There are propylene glycol JIITAKONETO, 1, 3-butane JIORUJI itaconate, 1, 4-butane JIORUJI itaconate, tetramethylen GURIKORUJI itaconate, pen TAERISURI Tursi itaconate, sorbitol tetra-itaconate, etc.

[0055]As crotonic acid ester, there are ethylene GURIKORUJI crotonate, tetramethylen GURIKORUJI crotonate, pen TAERISURI Tursi crotonate, sorbitol TETORAJI crotonate, etc. As isocrotonic acid ester, there are ethylene glycol JIISO crotonate, PENTA erythritol JIISO crotonate, and sorbitol tetra-iso Crotone ** etc. As ester maleate, there are an ethylene Glico RUJIMA rate, triethylene glycol JIMARETO, pen TAERISURI Tursi malate, sorbitol tetra-malate, etc. The mixture of the above-mentioned ester monomer can also be raised. [as an example of the monomer of the amide of an aliphatic polyamine compound and unsaturated carboxylic acid] Methylene ****- acryl amide, methylene ****- methacrylamide, There are hexamethylene-bis methacrylamide, diethylene triamine tris acryl amide, KISHIRIREN screw acryl amide, KISHIRIREN screw methacrylamide, etc. to 1 and 6- to hexamethylene-bis acryl amide, 1, and 6-.

[0056][the polyisocyanate compound which has two or more isocyanate groups as other examples in one molecule indicated in JP,S48-41708,B] The vinyl urethane compound containing two or more polymerization nature vinyl groups, etc. are raised into one molecule

which added the vinyl monomer containing the hydroxyl group shown by the following general formula (A).



(However, R and R' shows H or CH_3 .) Urethane AKURIRE ** which are indicated to JP,51-37193,A again, JP,48-64183,A, JP,49-43191,B, polyester acrylate that are indicated to JP,S52-30490,B, Acrylate and methacrylate of many organic functions, such as epoxy acrylate which made acrylic acid (meta) react to an epoxy resin, can be raised. What is introduced to Journal of the Adhesion Society of Japan vol.20, No.7, and 300 - 308 **-JI (1984) as an optical hardenability monomer and oligomer can be used. In this invention, these monomers can be used with chemical forms, such as pre polymer, i.e., a dimer, a trimer and oligomer or those mixtures, and those copolymers.

[0057]As for the amount of all the polymerization nature machine content compounds used containing the compound which has the structure shown by general formula (I), 10 to 70% of quantity is 1 to 99.99% of usually preferably used still more preferably 5 to 90.0% to the weight of all the ingredients of a photo polymerization nature constituent. (% said here is weight %).

[however the content of the compound of general formula (I) of this invention contained in all the polymerization nature machine content compounds] 0.005 to 100weight %, preferably, it is 30% - 100 weight %, and 1% - 100weight %, still more preferably, if there is less this quantity than 0.005, the effect of this invention may be unable to be demonstrated.

[0058]Next, the photopolymerization initiator used for the photo polymerization nature constituent of this invention is explained. As a desirable photopolymerization initiator, (a) aromatic ketone, (b) aromatic series onium salt compound, (c) Organic peroxide, (d) CHIO compound, (e) hexaaryl biimidazole compound, (f) A ketoxime ester compound, (g) borate compound, (h) horse mackerel NIUMU compound, a (i) metallocene compound, (j) activity ester compound, the compound that has (k) carbon halogen combination, etc. are mentioned. (a), [as a desirable example of aromatic ketone] "RADIATION CURING IN

POLYMERS SCIENCE AND TECHNOLOGY" J.P.FOUASSIER J.F.RABEK (1993), [as an example of the compound and more desirable (a) aromatic ketone which have the benzophenone skeleton or thioxan ton frame of 77 to p117 description] alpha-CHIOBENZOFENON compound given in JP,47-6416,B, a benzoin ether compound given in JP,47-3981,B, alpha-substitution benzoin compound given in JP,47-22326,B, a benzoin derivative given in JP,47-23664,B, AROIRU phosphonate given in JP,57-30704,A, dialkoxy benzophenone given in JP,60-26483,B, JP,60-26403,B, benzoin ether given in JP,62-81345,A, JP,1-34242,B, US,4,318,791,B, alpha-amino benzophenones given in the European Patent 0284561A No. 1, p-JI (dimethylamino benzoyl) benzene given in JP,2-211452,A, CHIO substitution aromatic ketone given in JP,61-194062,A, ASHIRU phosphine SURUFIDO given in JP,2-9597,B, ASHIRU phosphine given in JP,2-9596,B, thioxan tons given in JP,63-

61950,B, and Kumarin given in JP,59-42864,B can be mentioned.

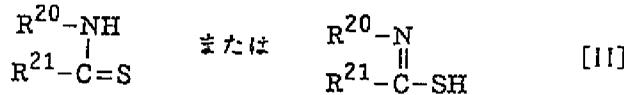
[0059]As (b) aromatic series onium salt which is another example, aromatic series onium salt of N, P, As, Sb, Bi, O, S, Se, Te, or I is contained in the Vth VI of a periodic law table and VII fellows' element, and a concrete target. As an example of such aromatic series onium salt, the compound shown in JP,52-14277,B, JP,52-14278,B, and JP,52-14279,B can be mentioned.

[0060]the organic compound which has one or more oxygen-oxygen combination in a molecule as (c) "organic peroxide" which is other examples of the photopolymerization initiator used for this invention, although all are almost contained, As the example, methyl ethyl ketone peroxide, cyclohexanon peroxide, 3, 3, 5-bird methyl cyclohexanon peroxide, methyl cyclohexanon peroxide, ASECHIRU acetone peroxide, 1, and 1-bis(tertiary butylperoxy)-3, 3, 5-trimethylcyclohexane, 1 and 1-bis(tertiary butylperoxy)cyclohexane, 2, and 2-bis(tertiary butylperoxy)butane, Tertiary butyl hydroperoxide, KUMEN hydroperoxide, Diisopropylbenzene hydroperoxide, PARAME tongue hydroperoxide, 2,5-dimethylhexane-2,5-dihydroperoxide, 1,1,3,3-tetrametylbutyl hydroperoxide, JITASHARII butyl peroxide, tertiary butyl cumyl peroxide, dicumyl peroxide, bis(tertiary butylperoxy isopropyl)benzene, 2, 5-*****- 2, 5-JI (tertiary butylperoxy) hexane, 2, 5-KISANOIRU peroxide, peroxidation ***** benzoyl peroxide, 2, 4-dichlorobenzoyl peroxide, meta--**** oil peroxide, JIISO propylperoxy dicarbonate, di-2-ethylhexylperoxycarbonate, Di-2-ethoxyethylperoxydicarbonate, dimethoxy isopropyl peroxy carbonate, JI (3-methyl 3-methoxy butyl) peroxy dicarbonate, Tertiary butylperoxy acetate, tertiary butylperoxy pivalate, Tertiary butylperoxyneodecanoate and tertiary butylperoxy octanoate, The tertiary butylperoxy 3 and 5, 5-trimethyl hexanoate, Tertiary butylperoxy laurate, tertiary carbonate, 3, 3'4, 4'-tetra-(tert-butyl peroxide carbonyl) benzophenone, 3, 3'4, 4'-tetra-(t-AMIRU peroxy carbonyl)benzophenone, 3, 3'4, 4'-tetra-(t-hexyl peroxy carbonyl)benzophenone, 3, 3'4, 4'-tetra-(t-octyl peroxy carbonyl)benzophenone, 3, 3'4, 4'-tetra-(cumyl peroxy carbonyl)benzophenone, There are 3, 3'4, 4'-tetra-(p-isopropyl cumyl peroxy carbonyl)benzophenone, KARUBONIRUJI (tert-butyl peroxide 2 hydrogen 2 phthalate), KARUBONIRUJI (t-hexyl peroxy 2 hydrogen 2 phthalate), etc. In these, a peroxidation ester system is preferred.

[0061](d) CHIO compound as a photopolymerization initiator used by this invention is shown by following general formula [II].

[0062]

[Chemical formula 9]



[0063](Here, R²⁰ shows an alkyl group, an aryl group, or a substitution aryl group, and R²¹ shows a hydrogen atom or an alkyl group.) R²⁰ and R²¹ show a nonmetallic atom group

required to form 5 members thru/or seven membered-rings which may also contain the hetero atom which combined with each other and was chosen from oxygen, sulfur, and a nitrogen atom. As an alkyl group in the above-mentioned general formula [II], a number of carbon atoms 1-4 piece thing is preferred. A number of carbon atoms 6-10 piece thing like a phenyl and Naff Chill as an aryl group is preferred, and, [as a substitution aryl group] What was replaced by the above aryl groups by an alkoxy group like a halogen atom like a chlorine atom, an alkyl group like a methyl group, a METOSHIKI machine, and an ethoxy basis is contained.

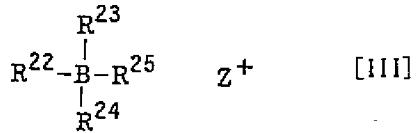
R^{21} is a number of carbon atoms 1-4 piece alkyl group preferably.

[0064]As (e) hexaaryl biimidazole which is other examples of the photopolymerization initiator used for this invention, JP,45-37377,B and ROFIN dimers given in JP,44-86516,B are mentioned.

[0065]As (f) ketoxime ester which is other examples of the photopolymerization initiator used by this invention, 3-benzoyloxy imino butane 2-ON, 3-acetoxy imino butane 2-ON, 3-propionyloxy imino butane 2-ON, 2-acetoxy imino pentane 3-ON, 2-acetoxy imino 1-phenyl propane 1-ON, 2-benzoyloxy minnow 1-phenyl propane 1-ON, 3-p-toluene sulfo NIRUOKISHIIMINO butane 2-ON, 2-ethoxycarbonyloxy imino 1-phenyl propane 1-ON, etc. are mentioned. The compound denoted by following general formula [III] as an example of (g) borate salt which is other examples of the photopolymerization initiator in this invention can be raised.

[0066]

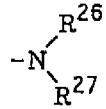
[Chemical formula 10]



[0067](Here, R^{22} , R^{23} , R^{24} , and R^{25} may be mutually the same, or may differ from each other, and) [**] Respectively Substitution or an unsubstituted alkyl group, substitution, or an unsubstituted aryl group, Substitution or an unsubstituted alkenyl group, substitution, an unsubstituted alkynyl group, substitution, or an unsubstituted heterocyclic machine is shown, the two or more basis may join together, and R^{22} , R^{23} , R^{24} , and R^{25} may form annular structure. However, at least one of R^{22} , R^{23} , R^{24} , and R^{25} is substitution or an unsubstituted alkyl group. Z^+ shows an alkaline metal cation or the 4th class ammonium cation. As an alkyl group of above-mentioned R^{22} - R^{25} , a straight chain, branching, and an annular thing are contained and a thing with 1-18 carbon atoms is preferred. Specifically, methyl, ethyl, propyl, isopropyl, butyl, pentyl, hexyl, octyl, stearyl, cyclo butyl, cyclopentyl, cyclohexyl, etc. are contained. As a substitution alkyl group, they are halogen atoms (for example, -Cl, -Br, etc.), a

cyano group, a nitro group, an aryl group (preferably phenyl group), and a hydroxy group to the above alkyl groups, [0068]

[Chemical formula 11]



[0069] R^{26} and R^{27} become independent here -- a hydrogen atom and the alkyl group of the carbon numbers 1-14. Or an aryl group is shown. - COOR^{28} (here -- R^{28} -- a hydrogen atom.) The alkyl group of the carbon numbers 1-14 or an aryl group is shown. - What has OCOR^{29} or $-\text{OR}^{30}$ (R^{29} and R^{30} show the alkyl group of the carbon numbers 1-14 or an aryl group here.) as a substituent is contained. As an aryl group of above-mentioned R^{22} - R^{25} , the aryl group of one to 3 rings, such as a phenyl group and a naphthyl group, is contained, and what has a substituent of the above-mentioned substitution alkyl group or an alkyl group of the carbon numbers 1-14 in the above aryl groups as a substitution aryl group is contained. As an alkenyl group of above-mentioned R^{22} - R^{25} , the straight chain of the carbon numbers 2-18, branching, and an annular thing are contained. As a substituent of a substitution alkenyl group, the thing quoted as a substituent of the aforementioned substitution alkyl group is contained.

As an alkynyl group of above-mentioned R^{22} - R^{25} , the straight chain of the carbon numbers 2-28 or the thing of branching is contained, and the thing quoted as a substituent of said substitution alkyl group is contained as a substituent of a substitution alkynyl group. As for more than the five-membered ring that contains at least one of N, S, and the O as a heterocyclic machine of above-mentioned R^{22} - R^{25} , the heterocyclic machine of five to 7 membered-ring may be mentioned preferably, and the condensed ring may be contained in this heterocyclic machine. It may have what was mentioned as a substituent of the above-mentioned substitution aryl group as a substituent. as the example of a compound shown by general formula [III] -- concrete -- a U.S. Pat. No. 3,567,453 item, said 4,343,891 No., and the European Patent No. 109,772 -- said -- the compound etc. which are indicated to No. 109 or 773 are mentioned.

[0070][as an example of (h) horse mackerel NIUMU salt compound which are other examples of the photopolymerization initiator of this invention] The compound group which has a N-O combination JP,63-138345,A, JP,63-142345,A, JP,63-142346,A, JP,63-143537,A, and given in JP,46-42363,B can be raised.

[0071][as an example of the (i) metallocene compound which are other examples of a photopolymerization initiator] JP,59-152396,A, JP,61-151197,A, JP,63-41484,A, JP,H2-249,A, a titanocene compound given in JP,H2-4705,A and JP,H1-304453,A, and an iron-arene

complex given in JP,H1-152109,A can be raised.

[0072]As an example of the above-mentioned titanocene compound, G cyclopentadienyl Ti-G chloride, A G cyclopentadienyl Ti-****- phenyl, G cyclopentadienyl Ti-****- 2, 3, 4, and 5, 6-pentafluoro Feni 1-IRU, G cyclopentadienyl Ti-****- 2, 3, and 5, 6-tetrafluoro Feni 1-IRU, G cyclopentadienyl Ti-****- 2 and 4, 6-trifluoro Feni 1-IRU, G cyclopentadienyl Ti-2, 6-difluoro Feni 1-IRU, G cyclopentadienyl Ti-****- 2, 4-difluoro Feni 1-IRU, G methylcyclopentadienyl Ti-****- 2, 3, 4, and 5, 6-pentafluoro Feni 1-IRU, G methylcyclopentadienyl Ti-****- 2, 3, and 5, 6-tetrafluoro Feni 1-IRU, G methylcyclopentadienyl Ti-****- 2, 4-difluoro Feni 1-IRU, a bis (cyclopentadienyl)-bis(2, 6-difluoro 3-(Pirie 1-IRU) phenyl)titanium bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(methyl SURUHON amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl beer *****- amino) phenyl] Titanium, [0073]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl acetylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-methyl acetylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl propionylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl (2 and 2-JIMECHIRU pig noil) amino) phenyl] Titanium, a bis (cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (2 and 2-JIMECHIRU pig noil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2,6-difluoro 3-(N-pentyl (2 and 2-JIMECHIRU pig noil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2 and 6-difluoro 3 -(N-hexyl)-(2 and 2-JIMECHIRU pig noil) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-methyl BUCHIRIRU amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-methyl PENTA noil amino) phenyl] Titanium, [0074]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl cyclohexyl carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl iso BUCHIRIRU amino) phenyl] Titanium, a bis (cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl acetylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2,2,5 and 5-tetramethyl 1,2,5-aza-*****- 1-IRU) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(octyl SURUHON amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(4-bird RUSURU phone amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(4-DODESHIRU phenyl slufonyl amide) phenyl] Titanium, [0075]Bis(cyclopentadienyl)screw [2,6-difluoro 3-(4-(1-pentyl HEPUCHIRU) phenyl slufonyl amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(ethyl sulfo nil amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(4-bromo phenyl) (- sulfo nil amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-NAFUCHIRU sulfo nil amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(hexadecyl sulfo nil amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-methyl (4-DODESHIRU phenyl) sulfo nil amide) phenyl] Titanium, [0076]Bis(cyclopentadienyl)screw [2,6-difluoro 3-(N-methyl 4-(1-pentyl HEPUCHIRU) phenyl) sulfo nil amide] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (4-trill)-sulfo

nil amide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(pyrrolidine 2, 5-*****- 1-IRU) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3 and 4-*****- 3-pyrrolidine 2, 5-*****- 1-IRU) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(FUTARU imide) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-iso butoxycarbonylamino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(ethoxycarbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-chloroethoxy) (- carbonylamino) phenyl] Titanium, [0077]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(phenoxy carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-phenylthio RAID) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-butyl CHIOU RAID) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-phenyl RAID) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-butyl UREIDO) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N and N-Gia Sept Iles amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3 and 3-JIMECHIRUU RAID) phenyl] Titanium, [0078]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(acetylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(BUCHIRIRU amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(decanoyleamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(octadecanoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(iso BUCHIRIRU amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-ethylhexanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-methyl pig noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(pivaloyl amino) phenyl] Titanium, [0079]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2 and 2-JIMECHIRU pig noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-ethyl 2-methyl hepta-noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(cyclohexyl carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2 and 2-*****- 3-chloro propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-phenyl propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-chloromethyl 2-methyl 3-chloro propanoyl amino) phenyl] Titanium, [0080]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3, 4-xylo ylarnino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(4-ethylbenzo ylarnino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2, 4, 6-MESHICHIRU carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-phenylpropyl) benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, 6-difluoro 3 - (N-(3-ethyl HEPUCHIRU)-2 and 2-dimethylpentanoyl amino)] Phenyl titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isobutyl (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isobutyl benzoylamino) phenyl] Titanium, [0081]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-

(N-cyclohexyl methyl pivaloyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(oxolany 2-ylmethyl) benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl) screw [2, a 6-difluoro 3-(N-(3-ethyl HEPUCHIRU)-2 and 2-JIMECHIRU pig noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, 6-difluoro 3 - (N-(3-phenylpropyl (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(oxolany 2-ylmethyl)- (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(4-toluyl methyl) benzoylamino) phenyl] Titanium, [0082]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(4-toluyl methyl)- (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2,6-difluoro 3-(N-(2,4-JIMECHIRU pentyl)-2 and 2-JIMECHIRU pig noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2,6-difluoro 3-(2,4-JIMECHIRU pentyl)-2 and 2-dimethylpentanoyl amino phenyl] Titanium, [0083]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(4-toluyl) (amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2 and 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2 and 2-*****- 3-ethoxy propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2 and 2-*****- 3-allyloxy propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ARIRU acetylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(2-ethyl pig noil amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methylbenzoyl amino) phenyl] Titanium, [0084]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methyl (4-toluyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(2-ethylhexyl) benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isopropyl benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-phenylpropyl)-2 and 2-dimethylpentanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methyl 2, 2-dimethylpentanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl benzoylamino) phenyl] Titanium, [0085]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(2-ethylhexyl)-2 and 2-dimethylpentanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl 2, 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isopropyl 2, 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-phenylpropyl) pivaloyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl 2, 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(2-methoxy ethyl) benzoylamino) phenyl] Titanium, [0086]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-BENJIRU benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-

difluoro 3-(N-benzoroux (4-tolyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(2-methoxy ethyl)- (4-tolyl) amino) phenyl] Titanium, a bis(cyclopentadienyl) screw [2, a 6-difluoro 3-(N-(4-methylphenyl methyl)-2 and 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(2-methoxy ethyl)-2 and 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methyl (2-ethyl 2-methyl hepta-noil) amino) phenyl] Titanium, [0087]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (2-ethyl 2-methyl pig noil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl 2, 2-dimethylpentanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(oxolany 2-ylmethyl)-2 and 2-dimethylpentanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl (2-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3 and 3*****- 2-azetidinon-1-yl) phenyl] Titanium, [0088]Bis(cyclopentadienyl)screw [2, 6-difluoro 3-isocyanato phenyl titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isobutyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (2 and 2*****- 3-chloro propanoyl) amino) phenyl] Titanium, [0089]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-phenyl propanoyl)-2 and 2*****- 3-chloro propanoyl) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methyl (2 and 2*****- 3-chloro propanoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, 6-difluoro 3 - (N-isobutyl (2 and 2*****- 3-chloro propanoyl) phenyl)] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (2-chloromethyl 2-methyl 3-chloro propanoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(BUCHIRUCHIO carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(phenylthio carbonylamino) phenyl] Titanium, [0090]Bis(cyclopentadienyl)screw [2, 6-difluoro 3-isocyanato phenyl titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isobutyl (4-trill sulfo nil) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (2 and 2*****- 3-chloro propanoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-phenyl propanoyl)-2 and 2*****- 3-chloro propanoyl) amino phenyl] Titanium, [0091]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl methyl (2 and 2*****-

*****- 3-chloro propanoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, 6-difluoro 3 - (N-isobutyl (2 and 2-*****- 3-chloro propanoyl) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (2-chloromethyl 2-methyl 3-chloro propanoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(BUCHIRUCHIO carbonylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(phenylthio carbonylamino) phenyl] Titanium, a bis(methylcyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl 2, 2-JIMECHIRU pig noil) amino phenyl] Titanium, [0092]Bis(methylcyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl 2, 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(methylcyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl acetylamino) phenyl] Titanium, a bis(methylcyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl propionylamino) phenyl] Titanium, a bis(trimethylsilyl pentadienyl)screw [2, a 6-difluoro 3-(N-butyl 2, 2-JIMECHIRU propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(2-methoxy ethyl)- trimethylsilyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl hexyl dimethylsilyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-ethyl (1, 1, 2, - bird methylpropyl) dimethylsilyl amino) phenyl] Titanium, [0093]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-ethoxymethyl 3-methyl 2-Azechi *****- 1-IRU) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-allyloxymethyl-3-methyl-2-azetidinon-1-yl) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(3-chloromethyl-3-methyl-2-azetidinon-1-yl) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-benzoroux 2, 2-JIMECHIRU propanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(5,5-dimethyl-2-pyrrolidinon-1-yl) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(6 and 6-diphenyl 2-*****- 1-IRU) phenyl] Titanium, [0094]Bis(cyclopentadienyl)screw [2, 6-difluoro 3 - (N-(2, 3-dihydro 1, 2-BENJISOCHI azo low 3-ON (1 and 1-dioxide)-2-IRU) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-hexyl (2-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-isopropyl (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(4-methylphenyl methyl)- (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N -(4-methylphenyl methyl)- (2-chloro benzoyl) amino) phenyl] Titanium, [0095]Bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-butyl (4-chloro benzoyl) amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-benzoroux 2, 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(2-ethylhexyl)-4-trill sulfo nil) amino phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3-OKISAHEPUCHIRU) benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3, 6-dioxa DESHIRU) benzoylamino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(trifluoromethylsulfonyl) amino phenyl] Titanium, a

bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(trifluoroacetyl amino) phenyl] Titanium, [0096]Bis (cyclopentadienyl)screw [2, a 6-difluoro 3-(2-chloro benzoyl) amino phenyl] Titanium, a bis (cyclopentadienyl)screw [2, a 6-difluoro 3-(4-chloro benzoyl) amino phenyl] Titanium, a bis (cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3, 6-dioxa DESHIRU)-2 and 2-dimethylpentanoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-(3, 7-*****- 7-methoxy octyl) benzoyl amino) phenyl] Titanium, a bis(cyclopentadienyl)screw [2, a 6-difluoro 3-(N-cyclohexyl benzoyl amino) phenyl] Titanium etc. can be mentioned.

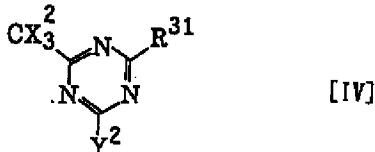
[0097]As an example of (j) activity ester compound which are other examples of a photopolymerization initiator, an imide sulfonate compound given in JP,62-6223,B, JP,63-14340,B, and activity sulfonate given in JP,59-174831,A can be raised.

[0098]As a desirable example of the compound which has (k) carbon halogen combination which is an example of a photopolymerization initiator, the thing of following general formula [IV] to [X] can be mentioned.

[0099]

[Chemical formula 12]

一般式 [IV]

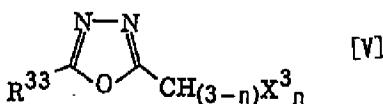


[0100](X² expresses a halogen atom among a formula.) Y² expresses -C(X²)₃, -NH₂, -NHR³², -NR³², and -OR³². R³² expresses an alkyl group, a substitution alkyl group, an aryl group, and a substitution aryl group here. R³¹ expresses -C(X²)₃, an alkyl group, a substitution alkyl group, an aryl group, a substitution aryl group, and a substitution alkenyl group. Compound expressed.

[0101]

[Chemical formula 13]

一般式 [V]

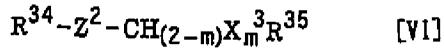


[0102]however, R³³ -- an alkyl group, a substitution alkyl group, and an alkenyl group. It is a substitution alkenyl group, an aryl group, a substitution aryl group, a halogen atom, an alkoxy group, a substitution alkoxy group, a nitro group, or a cyano group, X³ is a halogen atom, and n is an integer of 1-3. Compound expressed.

[0103]

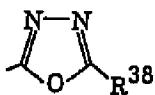
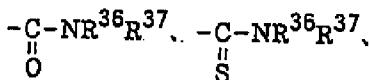
[Chemical formula 14]

一般式 [VI]



[0104](However R^{34} being an aryl group or a substitution aryl group. R^{35}) [0105]

[Chemical formula 15]

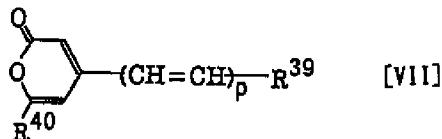


[0106]Or it is halogen and Z^2 is $-C(=O)-$, $-C(=S)-$, or $-SO_2-$, R^{36} and R^{37} are an alkyl group, a substitution alkyl group, an alkenyl group, a substitution alkenyl group, an aryl group, or a substitution aryl group, and R^{38} is general formula [IV]. It is the same as inner R^{32} , X^3 is a halogen atom, and m is 1 or 2. Compound expressed.

[0107]

[Chemical formula 16]

一般式 [VII]

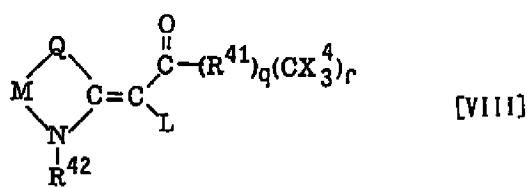


[0108]However, R^{39} is the aryl group or heterocyclic machine which may be replaced among a formula, R^{40} is the TORIHARO alkyl group or TORIHARO alkenyl group which has 1-3 carbon atoms, and p is 1, 2, or 3.

[0109]

[Chemical formula 17]

一般式 [VIII]

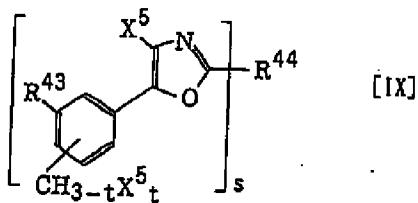


[0110](However, L is a substituent of hydrogen atom or formula:CO-(R⁴¹) q(C(X⁴)₃) r, and) [L] Q Sulfur, selenium or an oxygen atom, a JIARU kill methylene machine, Al ****- 1, 2-IREN machine, . . [be / M / it is 1 and 2-phenylene group or a N-R machine, and / substitution, an unsubstituted alkylene machine, or an alkenylene group] Or it is 1 and 2-Ally Wren machine, and R⁴² is an alkyl group, an aralkyl group, or an alkoxyalkyl group, R⁴¹ is a carbocyclic or heterocyclic divalent aromatic series machine, and X⁴ is chlorine, bromine, or an iodine atom, and is q= 0 and r= 1, or is q= 1 and r= 1, or 2. Carbonyl methylene heterocyclic compound which is expressed and which has a trihalogenomethyl machine.

[0111]

[Chemical formula 18]

一般式 [IX]

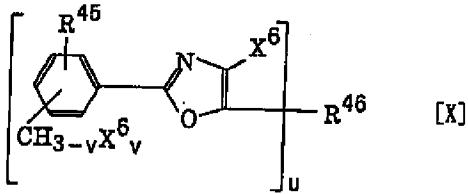


[0112](However, X⁵ is a halogen atom, and t is an integer of 1-3 and) [t] the unsaturated organic group by which s is an integer of 1-4, R⁴³ is a hydrogen atom or a CH_{3-t}X_{5t} machine, and, as for R⁴⁴, s value may be replaced -- it is -- 4-halogeno 5 expressed -(halogeno methyl phenyl)- an OKISAZORU derivative.

[0113]

[Chemical formula 19]

一般式 [X]



[0114](However, X⁶ is a halogen atom, and v is an integer of 1-3 and) [v] u is an integer of 1-4, R⁴⁵ is a hydrogen atom or CH_{3-v}X_{6v} machine, and R⁴⁶ is the unsaturated organic group by which u value may be replaced. 2-(halogenomethyl-phenyl)-4-halogeno-oxazole derivative expressed.

[0115][as an example of a compound of having such carbon-halogen combination] For example, Wakabayashi work, Bull. Chem. Soc. Japan, 42, the compound of 2924 (1969) descriptions, In addition, a compound given in the British JP,1388492,B Description, a

compound given in JP,53-133428,A, a compound given in the Germany patent No. 3337024 Description, etc. can be mentioned. The compound of J. Org. Chem. 29 by F.C. Schaefer etc. and 1527 (1964) descriptions can be mentioned. A compound given in JP,62-58241,A etc. can be mentioned. A compound given in JP,H5-281728,A etc. can be mentioned. Further Or M.P. Hutt, E. F. Elslager, and the 7th volume (No.3) of L. M. Herbel work "Journal of Heterocyclic chemistry", The compound group which a person skilled in the art can compound easily according to the synthesizing method indicated after the 511st page (1970). Or a compound which is indicated to the German patent No. 2641100, Or the compound indicated to the German patent No. 3333450, the compound group of a German patent [No. 3021590] description, or the compound group of a German patent [No. 3021599] description can be mentioned. As a more desirable example of the photopolymerization initiator in this invention, the photopolymerization initiator which generates RAJIKARU by operation of a laser beam with a wavelength of 300 nm - 1200 nm is preferred.

[0116][as a further more desirable example of the photopolymerization initiator in this invention] Above-mentioned (a) aromatic ketone, (b) aromatic series onium salt, (c) organic peroxide, (e) Can raise hexaaryl biimidazole, a (i) metallocene compound, and the compound that has (k) carbon halogen combination, and, [as further most desirable example] Aromatic series iodonium salt, aromatic diazonium salt, a titanocene compound, and the trihalomethyl S-triazine compound that is general formula [IV] and is expressed can be raised. The photopolymerization initiator in this invention is independent, or is suitably used by two or more sorts of combined use.

[0117]Next, dye or the paints which absorbs the light of a spectral sensitization pigment and a light source, and carries out an interaction to a photopolymerization initiator as sensitizing dye which can be one ingredient of the photo polymerization nature constituent of this invention is raised. As a desirable spectral sensitization pigment or dye, they are polynuclear aromatic series (for example, pyrene, PERIREN, triphenylene).

KISANTEN (for example, fluorescein, EOSHIN, erythrosine, low DAMINB, a rose bengal)

SHIANIN (for example, thia KARUBOSHIANIN, OKISAKARUBOSHIANIN)

Merocyanine (for example, merocyanine, KARUBO merocyanine) thia gin (for example, CHIONIN, methylene blue, toluidine blue)

AKURIJIN (for example, an acridine orange, a chloro hula bottle, an AKURI hula bottle)

Phthalocyanines (for example, phthalocyanine, metal phthalocyanine)

Porphyrins (for example, tetra-phenyl porphyrin, central metal substitution porphyrin)

Chlorophyll (for example, chlorophyll, chlorophyllin, central metal substitution chlorophyll) a metal complex and anthraquinone -- for example (anthraquinone)

SUKUARIUMU -- for example (SUKUARIUMU)

** is mentioned.

[0118]A more desirable spectral sensitization pigment or a styryl system pigment given [as an example of dye] in JP,37-13034,B, Positive ion dye given in JP,62-143044,A, KINOKISARINIUMU salt given in JP,59-24147,B, a new-methylene-blue compound given in JP,64-33104,A, anthraquinone given in JP,64-56767,A, benzoxanthene dyestuff given in JP,H2-1714,A. JP,H2-226148,A and AKURIJIN given in JP,H2-226149,A, The conjugate ketone pigment of pyrylium salt given in JP,40-28499,B, SHIANIN given in JP,46-42363,B, a benzofuran pigment given in JP,H2-63053,A, JP,H2-85858,A, and JP,H2-216154,A, a pigment given in JP,57-10605,A. An azo thinner MIRIDEN derivative given in JP,2-30321,B, cyanine dye given in JP,H1-287105,A, JP,62-31844,A, JP,62-31848,A, a xanthene dye given in JP,62-143043,A, amino styryl ketone given in JP,59-28325,B, merocyanine dye given in JP,61-9621,B, a pigment given in JP,H2-179643,A. Merocyanine dye given in JP,H2-244050,A, merocyanine dye given in JP,59-28326,B, Merocyanine dye given in JP,59-89303,A, merocyanine dye given in Tokuganhei6-269047, a benzopyran system pigment given in Tokuganhei7-164583, etc. can be mentioned.

[0119]In addition, the following infrared resonance agents (dye or paints) are also suitably used especially as sensitizing dye. As said desirable dye, the cyanine dye indicated to JP,58-125246,A, JP,59-84356,A, JP,59-202829,A, JP,S60-78787,A, etc., cyanine dye given in the British JP,434,875,B Description, etc. can be mentioned, for example.

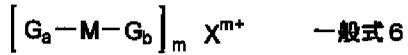
[0120]The feeling agent of near-infrared absorption increase of a description is also suitably used for the US,5,156,938,B Description, The arylbenzo(thio)pyrylium salt by which the description was replaced by the US,3,881,924,B Description, Bird methine thia pyrylium salt given in a JP,57-142645,A (US,4,327,169,B) gazette, JP,58-181051,A, 58-220143, 59-41363, 59-84248, 59-84249, 59-146063, A PIRIRIUMU system compound given in a 59-146061 gazette, a cyanine pigment given in JP,S59-216146,A, The pyrylium compound indicated in the PENTAME Jinzhou pyrylium salt of a description, etc. and JP,5-13514,B and a 5-19702 gazette is also preferably used for the US,4,283,475,B Description.

[0121]The near-infrared absorption dye indicated as formula (I) and (II) in the US,4,756,993,B Description and phthalocyanine dye given in EP 916513ANo. 2 Description can also be mentioned as desirable dye.

[0122]The anionic infrared resonance agent of a description can also be conveniently used for Tokuganhei10-79912. An anionic infrared resonance agent does not have cation structure in the mother nucleus of the pigment which absorbs infrared rays substantially, and shows what has anion structure. For example, the compound etc. which are denoted by an anionic (c1) metal complex, anionic (c2) carbon black, anionic (c3) phthalocyanine, and also (c4) the following general formula 6 are mentioned. The opposite cation of these anionic infrared resonance agents is a positive ion of the 1 value containing a proton, or a positive ion of ** value.

[0123]

[Chemical formula 20]



[0124]Here, an anionic (c1) metal complex shows that from which at least a central metal and ** of a complex part which absorb light substantially serve as an anion by the whole child.

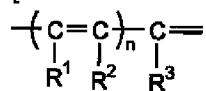
[0125](c2) The carbon black with which anion machines, such as sulfonic acid, carboxylic acid, and a phosphonate group, have combined anionic carbon black as a substituent is mentioned. What is necessary is just to take the means of oxidizing carbon black from predetermined acid so that it may be indicated to the 12th page with a carbon black manual of edition [third] (the volume on carbon black association, April 5, 1995, carbon black association issue) in order to introduce these bases into carbon black.

[0126](c3) The anion machine mentioned to the phthalocyanine frame in explanation [previously / (c2)] as a substituent combines anionic phthalocyanine, and what serves as an anion as a whole is shown.

[0127]Next, the compound denoted by the aforementioned (c4) general formula 6 is explained in detail. G_a^- expresses an anionic substituent among said general formula 6, and G_b expresses a neutral substituent. X^{m+} expresses the cation of 1 containing a proton - m value, and m expresses the integer of 1 thru/or 6. M may express a conjugate chain and this conjugate chain M may have a substituent and ring structure. The conjugate chain M can be denoted by a following formula.

[0128]

[Chemical formula 21]



[0129]Independently R^1 , R^2 , and R^3 among said formula, respectively A hydrogen atom, A halogen atom, a cyano group, an alkyl group, an aryl group, an alkenyl group, an alkynyl group, a carbonyl group, a thio group, a sulfonyl group, a sulfinyl group, an OKISHI machine, and an amino group are expressed, and these may be connected mutually and may form ring structure. n expresses the integer of 1-8.

[0130]A cationic infrared resonance agent and a nonionic infrared resonance agent can also be used preferably.

[0131]As other dye, the publicly known thing indicated in document, such as commercial dye and a "dye manual" (the Society of Synthetic Organic Chemistry, Japan edit, Showa 45 annual publications), can be used. Specifically Azo dye, metal complex salt azo dye, PIRAZORONAZO dye, naphth quinone dye, Dye, such as anthraquinone dye, phthalocyanine

dye, KARUBONIUMU dye, a quinonimine dye, methine dye, JIIMMONIUMU dye, aminium dye, a SUKUWARIRIUMU pigment, and a metal CHIORETO complex, is mentioned.

[0132]As other paints, as sensitizing dye, commercial paints and color index (C. I.) manual, The paints indicated to the "newest paints manual" (the volume for Japanese paints technical societies, 1977 annual publications), the "newest paints applied technology" (CMC publication, 1986 annual publications), "printer's ink technical" CMC publication, and 1984 annual publications can be used. For example, as a kind of paints, black paints and yellow paints, orange paints, brown paints, and red paints, purple paints, blue paints, a green pigment, a fluorescent pigment, a metallic flake pigment, and other polymer linkage pigments are mentioned. Specifically Insoluble azo pigment, an azo lake color, a condensation azo pigment, a chelate azo pigment, Phthalocyanine pigment, anthraquinone system paints, PERIREN, and PERINON system paints, CHIOINJIGO system paints, quinacridone paints, a dioxazinic pigment, iso India linon system paints, qionophthalone system paints, a blue-and-white porcelain lake color, AJIN paints, nitroso paints, nitroglycerine paints, natural paints, a fluorescent pigment, an inorganic pigment, carbon black, etc. can be used. A desirable thing is carbon black among these paints.

[0133]These paints may be used without carrying out a surface treatment, may perform a surface treatment and may be used. In the method of a surface treatment, the method of carrying out the surface coat of resin or the wax, the method to which a surface-active agent is made to adhere, the method of combining reactant substances (for example, the Silang coupling agent, an epoxy compound, a polyisocyanate, etc.) with the paints surface, etc. can be considered. The aforementioned surface treatment method is indicated to "the character of metal soap, application" (Saiwai Shobo), "printer's ink art" (CMC publication, 1984 annual publications), and the "newest paints applied technology" (CMC publication, 1986 annual publications).

[0134]As for the particle diameter of paints, it is preferred that they are 0.01 micrometer - 10 micrometers, it is still more preferred that they are 0.05 micrometer - 1 micrometer, and it is especially preferred that they are especially 0.1 micrometer - 1 micrometer. When the particle diameter of paints is less than 0.01 micrometer, it is not desirable in respect of the stability in the inside of the image recording layer coating liquid of a distributed thing, and if 10 micrometers is exceeded, it is not desirable in respect of the homogeneity of an image recording layer.

[0135]As a method of distributing paints, the publicly known dispersion techniques used for ink manufacture, toner manufacture, etc. can be used. As a distributed machine, an ultrasonic dispersion machine, SANDOMIRU, attritor, PARUMIRU, SUPAMIRU, a ball mill, an impeller, DESUPAZA, KDmil, a colloid mill, Dynatron, 3 RORUMIRU, a pressurized kneader, etc. are mentioned. For details, it is indicated to the "newest paints applied technology" (CMC

publication, 1986 annual publications).

[0136][as a further more desirable example of the sensitizing dye in this invention]

Merocyanine dye given [above-mentioned] in JP,61-9621,B, merocyanine dye given in JP,H2-179643,A, Merocyanine dye given in JP,H2-244050,A, merocyanine dye given in JP,59-28326,B, Merocyanine dye given in JP,59-89303,A, merocyanine dye given in Tokuganhei6-269047, and a benzopyran system pigment given in Tokuganhei7-164583 can be mentioned. And an infrared resonance agent given [above-mentioned] in JP,H11-209001,A can be mentioned. The sensitizing dye in this invention is also independent, or is suitably used by two or more sorts of combined use. The publicly known compound which raises sensitivity further or has an operation of controlling the polymerization prevention by oxygen may be added to the photo polymerization nature constituent of this invention as a co-sensitizer.

[0137]As an example of such a co-sensitizer, amine (1972), for example, 10th volume of M. R. Sander work "Journal of Polymer Society" 3173 pages, JP,44-20189,B, JP,51-82102,A, JP,52-134692,A,JP,59-138205,A, JP,60-84305,A, JP,62-18537,A, They are raised by JP,64-33104,A, the compound given in Research Disclosure No. 33825, etc., and specifically, Triethanol amine, p-dimethylaminobenzoic acid ethyl ester, p-HORUMIRUJI methylaniline, p-methyl CHIOJI methylaniline, etc. are raised.

[0138]As another example of a co-sensitizer, CHIORU and SURUFIDO, for example, JP,53-702,A, They are raised by JP,55-500806,B, thiol compounds given in JP,H5-142772,A, the disulfide compound of JP,56-75643,A, etc., and specifically, 2-MERUKAPUTO benzothia ZORU, 2-MERUKAPUTOBENZOOKI Southall, 2-MERUKAPUTO benzimidazole, 2-Mel Caputo 4(3H)-quinazoline, beta-MERUKAPUTONAFUTAREN, etc. are raised.

[0139]As another example, an amino acid compound (an example, N-phenylglycine, etc.), An organic metallic compound given in JP,48-42965,B (an example, tributyl tin acetate, etc.), A hydrogen donor given in JP,55-34414,B, sulfur compounds (an example, trithiane, etc.) given in Tokuganhei5-91089, phosphorus compounds (diethyl phosphite etc.) given in Tokuganhei5-32147, Si-H given in Tokuganhei6-191605, a germanium-H compound, etc. are raised.

[0140]The amount of the photopolymerization initiator used in the constituent in this invention is 0.05 to 30 weight % more preferably 0.01 to 60 weight % to the weight of all the ingredients of a photo polymerization nature constituent. When using sensitizing dye in this invention, it is 100:0-1:99, and the photopolymerization initiator in a photo polymerization nature constituent and the molar ratio of sensitizing dye are 90:10-10:90, and are 80:20-20:80 most preferably. When using the above-mentioned co-sensitizer, it is 0.05 to 10 weight section most preferably 0.02 to 20 weight section suitably [carrying out 0.01-50 weight-section use to photopolymerization initiator 1 weight section], and more preferably.

[0141]It is preferred to make the photo polymerization nature constituent of this invention contain the line organicity high molecular weight polymer as a binder. As such a "line organicity

high molecular weight polymer", as long as it is the line organicity high molecular weight polymer which has the ethylenic unsaturated compound and compatibility in which photo polymerization is possible, anything may be used. The line organicity high molecular weight polymer which is the water, weak alkali water solubility, or swelling nature which enables water development or weak alkali water development preferably is chosen. According to any shall be used between water, weak alkali water, or the organic solvent as a development agent, selection use of the line organicity high molecular weight polymer is suitably carried out not only as a coat formation agent of this constituent. For example, water development will be attained if a water-soluble organicity high molecular weight polymer is used. The addition polymer which has a carboxylic acid group in a side chain as such a line organicity high molecular weight polymer, For example, JP,59-44615,A, JP,54-34327,B, JP,58-12577,B, JP,54-25957,B, JP,54-92723,A, JP,59-53836,A, There are what is indicated to JP,59-71048,A, i.e., a methacrylic acid copolymer, an acrylic acid copolymer, an itaconic acid copolymer, a crotonic acid copolymer, a maleic acid copolymer, a partial etherification maleic acid copolymer, etc. A side chain has similarly an acid cellulose derivative which has a carboxylic acid group. In addition, the thing etc. which made the cyclic acid anhydride add to the addition polymer which has a hydroxyl group are useful. It is especially in these. [Ben Jill (meta) acrylate / (meta) acrylic acid / necessity is accepted, and it is other addition condensation nature vinyl monomer]. a copolymer -- and [ARIRU (meta) acrylate / (meta) acrylic acid / necessity is accepted, and it is other addition condensation nature vinyl monomer]. A copolymer is preferred. In addition, as a water-soluble line organicity polymer, poly vinyl pyrrolidone, polyethylene oxide, etc. are useful. In order to raise the intensity of a hardening coat, alcoholic soluble polyamide, polyether of 2 and 2-****- (4-hydroxyphenyl)-propane and EPIKUROROHI drine compounds, etc. are useful. These line organicity high molecular weight polymers can make arbitrary quantity mix during total composition. However, in exceeding 90 weight % to the weight of all the ingredients of a constituent, it does not give a desirable result in respect of the image strength etc. which are formed. It is 30 to 85% preferably. As for the ethylenic unsaturated compound and line organicity high molecular weight polymer in which photo polymerization is possible, it is preferred to consider it as the range of 1 / 9 - 7/3 by a weight ratio. More desirable ranges are 3 / 7 - 5/5. However, since itself has a function as a binder in using a polymer type thing as a compound which has the structure shown by general formula (I) of this invention, it is not necessary to contain the above-mentioned binder in a photo polymerization nature constituent. When using it, mixing with a binder, the ratio of polymer type the polymerization nature compound and binder of this invention can be used by an above-mentioned weight ratio.

CONTINUE

Continued translation.

[0142]In order to prevent a polymerization prohibition agent and the unnecessary thermal polymerization of the compound which has an ethylenic unsaturated double bond which can polymerize during photo polymerization nature constituent manufacture or preservation besides the above basic ingredient in this invention, it is desirable to add a little thermal polymerization prevention agents. As a suitable thermal polymerization prevention agent, hydroquinone, p-methoxy phenol, G t-butyl p-cresol, pyrogallol, t-butyl catechol, Benzoquinone, 4,4'-thiobis(3-methyl-6-t-butylphenol), a 2,2'-methylene screw (4-methyl 6-t-butylphenol), the first ceric salt of N-nitroso phenyl hydroxy amine, etc. are mentioned. As for the amount of addition of a thermal polymerization prevention agent, about 0.01 weight % - about 5 weight % are preferred to the weight of all the constituents. If needed, in order to prevent the polymerization prevention by oxygen, ** strange acid, a higher-fatty-acid derivative like behenic acid amide, etc. may be added, and it may be made unevenly distributed on the surface of a photosensitive layer in process of dryness after an application. About 0.5 weight % - about 10weight % of all the constituents of the amount of addition of a higher-fatty-acid derivative are preferred.

[0143]Colorant etc. may add dye or paints for the purpose of coloring of a photosensitive layer further. Thereby, the visibility after platemaking as a printing plate and what is called proof comparison nature called image concentration measurement machine aptitude can be raised. As colorant, since much dye produces the fall of the sensitivity of a photo polymerization system photosensitive layer, especially as colorant, its use of paints is preferred. As an example, there is dye, such as paints, such as phthalocyanine pigment, azo pigment, carbon black, and titanium oxide, ethyl violet, crystal violet, azo dye, anthraquinone dye, and cyanine dye. About 0.5 weight % - about 5weight % of all the constituents of the amount of addition of dye and paints are preferred.

[0144]In order to improve other additive agents and also the physical properties of a hardening coat, publicly known additive agents, such as an inorganic bulking agent, other plasticizers, admiration fat-ized agents in which the ink impression nature on the surface of a photosensitive layer is raised, and it deals, may be added.

[0145]As a plasticizer, for example, JIOKUCHIRU phthalate, didodecyl phthalate, Triethylene glycol dicaprylate, dimethyl glycol phthalate, tricresyl phosphate, dioctyl adipate, dibutyl sebacate, and doria -- there are SECHIRU glycerin etc., and when a binding material is used, it

can add 10 or less weight % to the sum total weight of the compound and binding material which have an ethylenic unsaturated double bond.

[0146]Addition of UV initiator, a heat crosslinking agent, etc. for strengthening the effect of heating and exposure after the development aiming at the improvement in film strength (print durability) mentioned later can also be performed.

[0147]In addition, it is possible in providing the additive agent for improving the adhesion disposition top of a photosensitive layer and a base material, and the development removal nature of an unexposed photosensitive layer, and an intermediate layer. With for example, addition and lower coating of the compound which has diazonium structure, and compounds which have a substrate and a comparatively strong interaction, such as a HOSUHON compound, Adhesion nature improves, it is possible to improve print durability, on the other hand, by the addition of hydrophilic polymer and the lower coating like polyacrylic acid and polysulfone acid, the development nature of a nonimage area improves and improvement in dirt nature is attained.

[0148]When applying the photo polymerization nature constituent of this invention on a base material, it melts in various organic solvents and use is presented. As a solvent used here, acetone, methyl ethyl ketone, cyclohexane, Ethyl acetate, ethylene dichloride, a tetrahydro franc, toluene, Ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, Ethylene glycol dimethyl ether, propylene glycol monomethyl ether, Propylene glycol monoethyl ether, ASECHIRU acetone, cyclohexanone, Diacetone alcohol, ethylene-glycol-monomethyl-ether acetate, Ethylene glycol ethyl ether acetate, ethylene glycol mono-isopropyl-ether, Ethylene glycol monobutyl ether acetate, 3-methoxy propanol, Methoxymethoxy ethanol, diethylene glycol monomethyl ether, Diethylene glycol monoethyl ether, diethylene glycol dimethyl ether, Diethylene glycol diethylether, propylene-glycol-monomethyl-ether acetate, Propylene glycol monoethyl ether acetate, 3-methoxy propyl acetate, N, and N-JIMECHIRU formamide, dimethyl sulfoxide, gamma-butyrolactone, lactic acid methyl, There are lactic acid ethyl etc. These solvents can be used being able to be independent or mixing. And 2 to 50 weight % is suitable for the concentration of the solid content in application solution.

[0149]As for the base material coating volume of a photosensitive layer, it is desirable to influence the sensitivity of a photosensitive layer, development nature, and the intensity and print durability of an exposure film, and to mainly choose suitably according to a use. Print durability becomes less enough when there is too little coating volume. On the other hand, in being too large, sensitivity falls and exposure takes time, and also it is not desirable in order for a processing procedure to also take longer time. As a common version printing plate for scanning exposure which are the main purposes of this invention, the range of about $0.1\text{g} / \text{m}^2$ - about $10\text{g} / \text{m}^2$ is suitable for the coating volume by the weight after dryness. They are 0.5-

5g / m² more preferably.

[0150]It is desirable for the surface to provide the above-mentioned photosensitive layer on the base material of hydrophilicity, for obtaining the common version printing plate which is one of the main purposes of "base material" this invention. The hydrophilic base material conventionally used for the publicly known common version printing plate as a base material of hydrophilicity can be used without limitation. That it is a stable board-shaped object in dimension the base material used preferably. for example, paper and a plastic (for example, polyethylene and polypropylene.) the paper and the metal plate (for example, the aluminum.) which polystyrene etc. laminated plastic films (for example, cellulose diacetate.), such as zinc and copper Cellulose triacetate, cellulose propionate, cellulose butyrate, cellulose acetate butyrate, Nitric acid cellulose, polyethylene terephthalate, polyethylene, polystyrene, Paper or a plastic film etc. in which the above metal, such as polypropylene, polycarbonate, and polyvinyl acetal, was laminated or vapor-deposited is contained, Suitable publicly known physical and chemical processing may be performed for grant of hydrophilicity, and the purpose, such as strength improvement, to these surfaces if needed.

[0151]As an especially desirable base material, paper, a polyester film, or an aluminum plate is mentioned, also in it, dimensional stability is good, and is comparatively inexpensive, and especially the aluminum plate that can provide the surface which was excellent in hydrophilicity or intensity by the surface treatment as occasion demands is preferred. The complex sheet in which the aluminium sheet was combined on a polyethylene terephthalate film which is indicated to JP,48-18327,B is also preferred.

[0152]A suitable aluminum plate is an alloy board which makes a pure aluminum board and aluminum the main ingredients, and contains a little different elements.

The plastic film laminated or vapor-deposited may be sufficient as aluminum.

Silicon, iron, manganese, copper, magnesium, chromium, zinc, bismuth, nickel, titanium, etc. are among the different elements contained in an aluminium alloy. The content of the different element in an alloy is at most 10 or less weight %. Although especially suitable aluminum is pure aluminum in this invention, since manufacture on refinement art is difficult for completely pure aluminum, a different element may be contained slightly. Thus, the composition is not specified and the aluminum plate of the material of publicly known public use can be conventionally used for the aluminum plate applied to this invention suitably. The thickness of the aluminum plate used by this invention is 0.2 mm - 0.3 mm especially preferably 0.15 mm - 0.4 mm preferably about 0.1 mm - about 0.6 mm.

[0153]In the case of metal, especially the base material which has the surface of aluminum, it is preferred that surface treatments, such as immersion treatment to solution, such as surface roughening (graining) processing, silicic acid soda, fluoridation zirconium acid potassium, and an phosphate, or anodization processing, are made.

[0154]Although the surface roughening process of the surface of an aluminum plate is performed by various methods, it is performed by the method of carrying out surface roughening mechanically, for example, the method of carrying out dissolution surface roughening of the surface electrochemically, and the method of carrying out the selection dissolution of the surface chemically. As a mechanical method, publicly known methods, such as the ball grinding method, the brush grinding method, the blast grinding method, a buff, and the ** method, can be used. There is the method of performing by exchange or direct current in electrolysis solutions, such as chloride and nitric acid, as an electrochemical surface roughening method. The method which combined both as indicated by JP,54-63902,A can also be used. In order to precede carrying out surface roughening of the aluminum plate and for a request to remove surface rolling oil, degreasing processing by surface-active agent, an organic solvent, or alkaline water solution is performed, for example.

[0155]After carrying out surface roughening, the aluminum plate by which immersion treatment was carried out to silicic acid sodium solution can use it preferably. After carrying out anodization processing of the aluminum plate as indicated to JP,47-5125,B, what carried out immersion treatment to solution of alkaline metal silicate is used suitably. Anodization processing is carried out by sending current by making an aluminum plate into an anode in the electrolysis solution which solution of organic acid, such as inorganic acid, such as phosphoric acid, chromic acid, sulfuric acid, and ****, or oxalic acid, and sulfamic acid, or those salt or non-solution was independent, or combined two or more sorts, for example.

[0156]Silicate electrodeposition which is indicated to US,3658662,B is also effective.

[0157]The base material which gave electrolysis grain which is indicated by JP,46-27481,B, JP,52-58602,A, and JP,52-30503,A, and the surface treatment which combined the above-mentioned anodization processing and silicic acid soda processing are also useful.

[0158]What performed in order mechanical surface roughening, chemical etching, and electrolysis grain, anodization processing, and also silicic acid soda processing which are indicated by JP,56-28893,A is preferred.

[0159]After performing these processings, what lower-applied the polymer which has water-soluble resin, for example, polyvinyl phosphonic acid, and a sulfonic group in a side chain and a copolymer, polyacrylic acid, water-soluble metal salt (for example, **** zinc) or yellow dye, amine salt, etc. is preferred.

[0160]the sol to which the covalent bond of the functional group which is indicated by Tokuganhei5-304358, and which can therefore cause an addition reaction radically was carried out -- a -**** treating substrate is also used suitably.

[0161]In addition, what provided the waterproof hydrophilic layer as a surface coat on arbitrary base materials as a desirable example can be raised. As such a surface coat, for example, the layer which consists of an inorganic pigment and a binder of US [No. 3055295] given in

JP,56-13168,A, The sol gel membrane etc. which consist of a hydrophilic swelling layer given in JP,H9-80744,A, titanium oxide given in Patent Publication Heisei No. 507727 [eight to], polyvinyl alcohol, and silicic acid can be mentioned.

[0162]These hydrophilicity-ized processings are performed for Hitoshi Kougami of the adhesion nature of a photosensitive layer, in order to prevent the harmful reaction of the photo polymerization nature constituent provided on it besides being given in order to make the surface of a base material into hydrophilicity.

[0163]In "protection layer" this invention, in the common version printing plate for scanning exposure, since it usually exposes in the atmosphere, a protection layer can be further provided on the layer of a photo polymerization nature constituent. A protection layer prevents mixing to the photosensitive layer of low-molecular compounds, such as a basic substance which exists in the atmosphere which checks the image formation reaction produced by exposure in a photosensitive layer, and enables exposure in the atmosphere. Therefore, the characteristic which such a protection layer is expected is that the permeability of a low-molecular compound is low.

It is desirable that the real prevention of the penetration of the light used for exposure is not carried out, but it excels in adhesion nature with a photosensitive layer, and can remove easily at the development process after exposure.

The device about such a protection layer is made conventionally, and is indicated in detail to US,3,458,311,B and JP,55-49729,A. If it is considered as the material which can be used for a protection layer, it is good to use the water-soluble high molecular compound excellent in crystallinity comparatively, and specifically, Although water-soluble polymer, such as polyvinyl alcohol, poly vinyl pyrrolidone, acid cellulose, gelatin, gum arabic, and polyacrylic acid, is known, Using polyvinyl alcohol as the main ingredients gives the best results in basic characteristic, such as oxygen interception nature and development removal nature, among these. As long as the polyvinyl alcohol used for a protection layer contains the unreplaceable vinyl alcohol unit for having required oxygen interception nature and water solubility, the part may be replaced by ester, ether, and ASETARU. The part may have other copolymer components similarly. as the example of polyvinyl alcohol -- 71-100-mol % -- it is hydrolyzed and a molecular weight can mention the thing of the range of 300 to 2400 by a weight average molecular weight. Specifically KURARAY CO. LTD. PVA-105, PVA-110, PVA-117, and PVA-117H, PVA-120, PVA-124, and PVA-124H, PVA-CS, PVA-CST, PVA-HC, PVA-203, PVA-204, PVA-205, PVA-210, PVA-217, PVA-220, PVA-224, PVA-217EE, PVA-217E, PVA-220E, PVA-224E, PVA-405, PVA-420, PVA-613, and L-8 grade are mentioned.

[0164]The ingredient (selection of PVA, use of an additive agent) of a protection layer, the amount of applications, etc. are chosen in consideration of KABURI nature, or adhesion nature and damage resistance besides low-molecular substance interception nature and development

removal nature. Low-molecular substance interception nature becomes high, and is so advantageous in respect of sensitivity that film thickness is so so thick that the hydrolysis rate of PVA generally used is high (that the unreplaced vinyl alcohol unit content in a protection layer is high). However, if low-molecular substance interception nature is improved extremely, the problem that a polymerization reaction unnecessary at the time of raw preservation arises, and *** of unnecessary KABURI and *** arises at the time of picture exposure will be produced at the time of manufacture. Adhesion nature with a picture part and damage resistance are also very important on the handling of a version. That is, if the layer of the hydrophilicity which consists of water-soluble polymer is laminated in an oleophilic polymerization layer, it will be easy to generate the film exfoliation by the shortage of adhesive strength. On the other hand, various proposals are made that the adhesiveness between two-layer [these] should be improved. For example, [US,292501,B and US,44563,B] It is indicated by by mixing acrylic emulsion or a water-insoluble nature vinyl-pyrrolidone vinyl acetate copolymer 20 to 60weight %, and laminating on a polymerization layer in the hydrophilic polymer which mainly consists of polyvinyl alcohol, that sufficient adhesiveness is acquired. To the protection layer in this invention, each of such publicly known art is applicable. The coating method of such a protection layer is indicated in detail, for example to US,3,458,311,B and JP,55-49729,A.

[0165]Other functions can also be given to a protection layer. For example, when using a laser beam as a light source, as a photosensitive composition, it excels in photosensitivity in the light source wavelength, but there is a case where I do not want you to expose, on other wavelengths. For example, if a light source is a thing of a not less than 750-nm infrared region, it can be used in a substance top lightroom, but lights of shortwave, such as light of a fluorescent light, may also be exposed in fact. In that case, addition of colorant (water-soluble dye etc.) which is excellent in the light transmittance state of a light source, and may absorb wavelength light below 700 nm efficiently is preferred. If a light source is a thing of an ultraviolet region of 450 nm or less as another example, it can be used under a substance top safe light. However, it may expose by not less than 500-nm visible light in fact. In that case, safe light aptitude can be further improved by addition of colorant (water-soluble dye etc.) which is excellent in the light transmittance state of a light source, and may absorb not less than 500-nm light efficiently, without causing a sensitivity fall.

[0166]When using photosensitive materials using a photo polymerization nature constituent of this invention as an image formation material, after carrying out picture exposure, an unexposed part of a photosensitive layer is removed by a developing solution, and a picture is usually obtained. [as a desirable developing solution at the time of using these photo polymerization nature constituents for creation of the common version printing plate] A developing solution which is indicated to JP,57-7427,B is mentioned, A sodium silicate, a

potassium silicate, sodium hydroxide, a potassium hydrate, Lithium hydroxide, sodium tertiary phosphate, sodium diphosphate, the third ammonium phosphate, Solution of organic alkaline chemicals, such as inorganic alkaline chemicals, such as the second ammonium phosphate, metasilicic acid sodium, sodium bicarbonate, and an ammonia solution, monoethanolamine or JIETANORU amine, is suitable. 0.1 to 10weight %, concentration of such an alkaline solution is added so that it may become 0.5 to 5weight % preferably.

[0167]A little organic solvents like a surface-active agent, ** NJIRU alcohol, 2-phenoxyethanol, and 2-butoxy ethanol can be included in such alkaline water solution if needed. For example, what is indicated to US,3375171,B and 3615480 can be mentioned.

[0168]The developing solution indicated in each gazette of JP,50-26601,A, 58-54341, JP,56-39464,B, and 56-42860 is also excellent.

[0169]In addition, as a platemaking process of the planographic printing original plate which is a suitable use of the photo polymerization nature constituent of this invention, the whole surface may be heated before exposure and during exposure from exposure before development if needed. The image formation reaction in a photosensitive layer is promoted by such heating, and advantages, such as improvement in sensitivity or print durability and stabilization of sensitivity, may arise. It is also effective to perform heating behind the whole surface or complete exposure to the picture after development for the purpose of improvement in image strength and print durability. Usually, it is preferred to perform heating before development on mild conditions 150 ** or less. If temperature is too high, the problem of even a nonimage area wearing will be produced. Very strong conditions are used for heating after development. Usually, it is the range of 200-500 **. If temperature is low, sufficient picture strengthening operation will not be obtained, but in being too high, it produces problems, such as degradation of a base material and thermal cracking of a picture part. A publicly known method can be used for the exposure method of the scanning exposure common version printing plate by this invention without restriction. As a light source, laser is preferred. For example, the following can be used as a laser light source with an available wavelength of 350-450 nm.

[0170]As a gas laser, it is Ar ion laser (351 nm 364 nm). [as 10mW-1W, Kr ion laser (356 nm, 351 nm, 10mW-1W), helium-Cd laser (441 nm, 325 nm, 1 mW - 100 mW), and a solid-state laser] [as Nd:YAG (YVO₄), SHG crystal x2 time combination (355 nm, 5mW-1W), the combination (430 nm, 10 mW) of Cr:LiSAF and a SHG crystal, and a semiconductor laser system] KNbO₃, a ring resonator (430 nm, 30 mW), the guided type wavelength conversion element of waves, and AlGaAs, The combination of an InGaAs semiconductor (380 nm - 450 nm, 5 mW - 100 mW), Combination of the guided type wavelength conversion element of waves, AlGInP, and an AlGaAs semiconductor (300 nm - 350 nm) 5 mW - 100 mW, and

AlGaN (350 nm - 450 nm, 5 mW - 30 mW) -- in addition to this -- as a pulse laser -- N₂ laser (337 nm, the pulse 0.1 - 10mJ) and XeF (351 nm, the pulse 10 - 250mJ)

[0171]An AlGaN semiconductor laser (400-410 nm of commercial InGaN system semiconductor lasers, 5-30 mW) is preferred in respect of the wavelength characteristic and cost especially in this.

[0172]As an available light source (450 nm - 700 nm), in addition, Ar+ laser (488 nm), YAG-SHG laser (532 nm), helium-Ne laser (633 nm), As helium-Cd laser, a red semiconductor laser (650-690 nm), and an available light source (700 nm - 1200 nm), a semiconductor laser (800-850 nm) and Nd-YAG laser (1064 nm) can use suitably.

[0173]In addition, ultra-high pressure, high pressure, inside pressure, each low-pressure mercury lamp, a chemical lamp, carbon arc light, Although an electron beam, X-rays, an ion beam, far-infrared rays, etc. can be used as KISENON light, metal halide light, the laser lamps (an ArF excimer laser, a KrF excimer laser, etc.) besides purple, and radiation, especially a not less than 350-nm above-mentioned laser light source is preferred at an inexpensive point.

[0174]Any, such as an inside drum method, an outside drum method, and a flatbed method, may be sufficient as an exposure mechanism. Although the photosensitive layer ingredient of this invention can also be made meltable in neutral water and weak alkali water by using a water-soluble high thing, the common version printing plate of such composition can also hold a method called exposure-development by on a plane after loading on a printing machine.

[0175]As a use of the photo polymerization nature constituent by this invention, it is large besides the common version printing plate for scanning exposure, and can apply to what is known as a use of optical hardening resin without restriction. for example, the thing to apply to the liquefied photo polymerization nature constituent used together with the cation pile affinity compound if needed -- high -- the sensitivity charge of Mitsuzo form material is obtained. The change of a refractive index accompanying photo polymerization can be used, and it can also be considered as hologram material. It is applicable also to various transfer materials (an exfoliation sensitized material, a toner development sensitized material, etc.) using the change of surface adhesiveness accompanying photo polymerization. It is applicable also to optical hardening of a microcapsule. It is applicable also to optical hardening resin materials, such as electronic industry material manufacture of photoresist etc., ink, a paint, adhesives.

[0176]

[Working example]Hereafter, although an embodiment explains this invention, this invention is not limited to these embodiments.

[0177]From the acrylics machine content compound in which the compound of <composition of having-structure shown by general formula (I) of this invention compound> above-mentioned general formula (I) corresponds With the method of a description. ["technical of adhesion" Vol.14 No.4 (1995) 37th-volume-of-the-set p.2 of the Adhesion Society of Japan issue] It is

easily compoundable.

[0178]The chloro acetonitrile and triethyl phosphite of the <synthetic example 1:A-1> equimolar amount 120 **, The JIECHIRU cyano methyl phosphonate (0.4 mol) and 30wt% formalin aqueous solution (160 ml) which were obtained were slowly put into 15 ** saturated potassium carbonate solution (96g) after 28-hour churning, and it agitated at 35 ** for 1 hour. After a reaction, a saturation salt solution (150 ml) is added, and vacuum concentration is dried and carried out with magnesium sulfate after extraction by diethylether. A-1 made into the purpose was obtained at 17.6 g (53% of ****). The structure of a compound is checked by NMR, MASS, and IR.

[0179]The example 2 of < composition: Put in A-1 (0.1 mol), ethyl acetate (100 ml), pyridine (1.0 mol), and DMAP (4-dimethylamino pyridine) (0.1 mol) in a compound A-12> flask. Next, it is dropped under ice-cooling of HEKISA noil chloride (1.0 mol) in 1 hour, returns to room temperature, and agitates for 3 hours. 200 ml of water was put in after the reaction, the ethyl acetate layer was extracted, and when it filtered and vacuum concentration was fully carried out after dryness with magnesium sulfate, the compound A-12 was obtained by 90% of ****. The structure of a compound is checked by NMR, MASS, and IR.

[0180]The example 3 of < composition: Put in A-1 (0.1 mol), PBr_3 (0.1 mol), and a carbon tetrachloride (100 mol) in a compound A-25> flask. A-25 was obtained by 70% of **** by carrying out distillation under reduced pressure after 5-hour churning at 100 **. The structure of a compound is checked by NMR, MASS, and IR.

[0181]The example 4 of < composition: Put in the compound A-1 (0.1 mol), ethyl acetate (100 ml), and the pyridine (0.1 mol) (0.01 mol) (4-dimethylamino pyridine) DMAP in a compound B-9> flask. Next, it is dropped in 30 minutes under ice-cooling of terephthalic acid chloride (0.05 mol), returns to room temperature, and agitates for 3 hours. 200 ml of water was put in after the reaction, the ethyl acetate layer was extracted, and when it filtered and vacuum concentration was fully carried out after dryness with magnesium sulfate, the compound B-9 was obtained by 90% of ****. The structure of a compound is checked by NMR, MASS, and IR.

[0182]The example 5 of < composition : In a compound C-2> flask, A-25 (0.1 mol), PENTA erythritol (0.025 mol), N, and N'-JIMECHIRU aceto amide (100 ml) is put in, Next, triethyl amine (0.1 mol) is put in, 300 ml of water is put in after a 12-hour reaction at 100 **, ethyl acetate extracts, with magnesium sulfate, after dryness, it filters and vacuum concentration is fully carried out. The obtained output was refined by SiO_2 column chromatography (ethyl acetate / hexane mixed-solution system), and C-2 was obtained by 50% of ****. The structure of a compound is checked by NMR, MASS, and IR.

[0183]All the compounds shown in the example as mentioned above are compoundable. About a polymer object, the same method as an above-mentioned synthetic example is used for the

polymer which copolymerized with other existing monomers or prepared beforehand the monofunctional monomer of this invention produced by making it the same, and it can compound easily by introducing the polymerization nature machine of this invention into the side chain by a polymeric reaction.

[0184]After immersing the aluminum plate with a <Embodiment 1 of photo polymerization nature constituent> (manufacture of base material) thickness of 0.3 mm in sodium hydroxide for 25 seconds at 60 ** 10weight % and etching it, with running water, neutralization washing was carried out with nitric acid after-flush 20weight %, and, subsequently it washed. The electrolysis surface roughening process was performed for this in the amount of electricity in 1 weight % nitric acid solution using the police box waveform current of a sine wave at the time of the anode of 300 C / dm². In the inside of 20 weight % sulfuric acid solution after being immersed into 30weight % of sulfuric acid solution after immersion for 5 seconds at 40 ** and carrying out a desmut treatment for 40 seconds at 60 ** into 1 weight % sodium hydroxide solution succeeding, and current density 2A/dm², Anodization processing was carried out for 2 minutes so that the thickness of anodic oxide coating might become 2.7g / m². When the surface coarseness was measured, it was 0.3 micrometer (Ra display by JIS B0601).

[0185]The following backcourt coating liquid was applied to the back of the substrate processed in this way by bar KOTA, it dried for 1 minute at 100 **, and the amount of applications after dryness created the base material which provided the backcourt layer of 70 mg / m².

[0186]

sol -- -**** reaction liquid Tetraethyl silicate 50 weight section Water 20 weight section Methanol 15 weight section Phosphoric acid 0.05 weight section[0187]When the above-mentioned ingredient was mixed and agitated, generation of heat began in about 5 minutes. Backcourt coating liquid was prepared by adding the liquid shown in below back [that was made to react for 60 minutes].

[0188]

Pyrogallol formaldehyde condensation resin (molecular weight 2000). Four weight sections Dimethyl phthalate 5 weight section Fluorochemical surfactant (N-butyl perfluoro-octane 0.7 weight-section SURUHON amide ethyl acrylate / polyoxy ethylene acrylate copolymer: molecular weight 20,000)

methanol silica -- sol (the Nissan Chemical Industries, Ltd. make, 30 weight % of methanol) 50 weight sections Methanol 800 weight section[0189](Manufacture of a photosensitive layer) Applied the photo polymerization nature constituent of the following composition on the aluminum plate processed in this way so that the amount of dry applications might become 1.5 g/m², and it was made to dry at 100 ** for 1 minute, and the photosensitive layer was made to

form.

(Photosensitive layer formation solution)

Compound [X] 1.2g which has this invention of following table-4, or a comparative polymerization nature machine Photopolymerization initiator [Y] of following table-4 0.3g Polymer binder [Z] of following table-4 2.0g Polymerization nature compound [R] of following table-4 r g (r is table-4 reference)

Additive agent [S] of following table-4 0.4g fluorochemical surfactant (MEGAFAKKU F-177: made by Dainippon Ink & Chemicals, Inc.)

0.03 g [Composition: Pigment Blue 15:6 15 weight-section ARIRU methacrylate / methacrylic acid copolymer .] Thermal polymerization prohibition agent N-nitroso phenyl

HIDOROKISHIRUAMISHI aluminum salt 0.01 g Pigment dispersion thing 2.0 g Composition of a pigment dispersion thing Ten weight sections (copolymerization molar ratios 83/17)

Cyclohexanone 15 weight section Methoxy propyl acetate 20 weight section Propylene-glycol-monomethyl-ether 40 weight section Methyl ethyl ketone 20 g Propylene glycol monomethyl ether 20g[0190](Adjustment of a protection layer) To a part of above-mentioned photosensitive layer (shown in following table-4), on the photosensitive layer, 3weight % of solution of polyvinyl alcohol (the degree %, the degree of polymerization 550 of 98 mol of saponification)

was applied so that dry application weight might become $2g[m]^{-2}$, and it dried for 2 minutes at 100 **.

[0191](Evaluation of sensitivity) The sensitized material obtained in this way used a light source which is different according to the exposure wavelength, respectively, and performed sensitivity evaluation. For example, it exposed in the atmosphere, using respectively a 400 nm semiconductor laser, 532 nm FD-YAG laser, and an 830-nm semiconductor laser. The sensitivity in each exposure condition was computed per mJ/cm^2 from the minimum light exposure which develops 25 ** to the developing solution of the following composition by being immersed for 10 seconds and as for which a picture is made to it. The one where this figure is smaller is high sensitivity. However, since the amounts of energy which per photon has differ when a light source wavelength is different, an above-mentioned light exposure is enabled to expose at least, so that it usually becomes shortwave, even if it thinks simply, and the direction of shortwave serves as high sensitivity. Therefore, table-5 is for there being no meaning in sensitivity comparison between different exposure conditions, and seeing the difference in the embodiment and comparative example in the same exposure conditions to the last. A result is shown in following table-5.

(Composition of a developing solution)

DP-4 (made by Fuji Photo Film Co., Ltd.) 65.0g Water 880.0 g RIPOMIN LA (20% solution, Lion company make) 50.0 g[0192](Evaluation of preservation stability) The above-mentioned photosensitive materials before laser exposure are neglected for three days under high

temperature service (60 **), Laser exposure of the sensitized material after this preservation was carried out like the above after that, the amount of energy required for record was computed, and it asked for the energy ratio (energy before the energy / high temperature preservation after high temperature preservation) before and behind highly humid preservation. That this energy ratio is 1.1 or less can say preferably that it is good also in preservation stability on manufacture. This evaluation result is also shown in following table-5.

[0193]

[Table 8]

<表-4 : 感材>

	X	Y	Z	R (r)	S	保護層の有無	光波 (nm)
実施例1	B-1	Y-1	Z-1	なし	なし	あり	400
実施例2	B-5	Y-1	Z-1	なし	なし	あり	400
実施例3	B-9	Y-2	Z-2	なし	S-1	あり	400
実施例4	B-1 2	Y-2	Z-2	なし	なし	あり	400
実施例5	C-2	Y-1	Z-2	なし	S-3	あり	400
実施例6	C-1 1	Y-2	Z-1	なし	S-4	あり	400
実施例7	G-1	Y-2	なし	R-1 (1. 0)	S-2	あり	400
実施例8	G-5	Y-1	なし	R-2 (1. 5)	S-1	あり	400
比較例1	xb-1	Y-1	Z-1	なし	なし	あり	400
比較例2	xb-5	Y-1	Z-1	なし	なし	あり	400
比較例3	xb-9	Y-2	Z-2	なし	S-1	あり	400
比較例4	xb-1 2	Y-2	Z-2	なし	なし	あり	400
比較例5	xc-2	Y-1	Z-2	なし	S-3	あり	400
比較例6	xc-1 1	Y-2	Z-1	なし	S-4	あり	400
比較例7	xe-1	Y-2	なし	R-1 (1. 0)	S-2	あり	400
比較例8	xe-5	Y-1	なし	R-2 (1. 5)	S-1	あり	400
実施例9	B-1	Y-3	Z-1	R-1 (0. 5)	なし	あり	532
実施例10	B-5	Y-3	Z-1	なし	なし	あり	532
実施例11	B-9	Y-4	Z-1	なし	S-1	あり	532
実施例12	B-1 2	Y-4	Z-2	なし	S-2	あり	532
実施例13	C-2	Y-5	Z-2	なし	S-3	あり	532
実施例14	C-1 1	Y-4	Z-1	なし	S-4	あり	532
実施例15	G-1	Y-4	なし	R-1 (1. 0)	S-2	あり	532
実施例16	G-5	Y-3	なし	R-2 (1. 0)	なし	あり	532
比較例9	xb-1	Y-3	Z-1	R-1 (0. 5)	なし	あり	532
比較例10	xb-5	Y-3	Z-1	なし	なし	あり	532
比較例11	xb-9	Y-4	Z-1	なし	S-1	あり	532
比較例12	xb-1 2	Y-4	Z-2	なし	S-2	あり	532
比較例13	xc-2	Y-5	Z-2	なし	S-3	あり	532
比較例14	xc-1 1	Y-4	Z-1	なし	S-4	あり	532
比較例15	xe-1	Y-4	なし	R-1 (1. 0)	S-2	あり	532
比較例16	xe-5	Y-3	なし	R-2 (1. 0)	なし	あり	532
実施例17	B-1	Y-5	Z-1	R-1 (0. 5)	なし	なし	830
実施例18	B-5	Y-6	Z-1	なし	なし	なし	830
実施例19	B-9	Y-6	Z-1	なし	S-5	なし	830
実施例20	B-1 2	Y-7	Z-2	なし	S-5	なし	830
実施例21	C-2	Y-7	Z-2	なし	S-6	なし	830
実施例22	C-1 1	Y-8	Z-1	なし	S-7	なし	830
実施例23	G-1	Y-8	なし	R-1 (1. 0)	なし	なし	830
実施例24	G-5	Y-9	なし	R-2 (1. 0)	なし	なし	830
比較例17	xb-1	Y-5	Z-1	R-1 (0. 5)	なし	なし	830
比較例18	xb-5	Y-6	Z-1	なし	なし	なし	830
比較例19	xb-9	Y-6	Z-1	なし	S-5	なし	830
比較例20	xb-1 2	Y-7	Z-2	なし	S-5	なし	830
比較例21	xc-2	Y-7	Z-2	なし	S-6	なし	830
比較例22	xc-1 1	Y-8	Z-1	なし	S-7	なし	830
比較例23	xe-1	Y-8	なし	R-1 (1. 0)	なし	なし	830
比較例24	xe-5	Y-9	なし	R-2 (1. 0)	なし	なし	830

[0194]

[Table 9]

<表-5：評価結果>

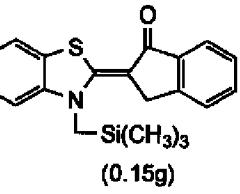
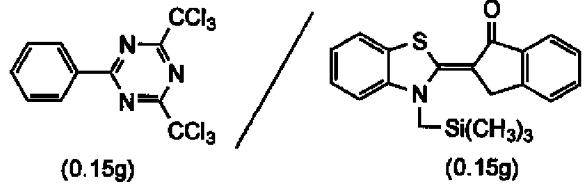
	感度 (mJ/cm ²)	保存安定性 (比)
実施例 1	0. 0 5	1. 1
実施例 2	0. 0 6	1. 1
実施例 3	0. 0 5	1. 1
実施例 4	0. 1	1. 1
実施例 5	0. 0 6	1. 1
実施例 6	0. 1	1. 0 5
実施例 7	0. 1	1. 1
実施例 8	0. 0 5	1. 1
比較例 1	0. 2 5	2. 0
比較例 2	0. 2	2. 0
比較例 3	0. 2	1. 5
比較例 4	0. 2	2. 0
比較例 5	0. 2 5	1. 5
比較例 6	0. 3	1. 5
比較例 7	0. 2	2. 0
比較例 8	0. 3	1. 5
実施例 9	0. 1	1. 1
実施例 1 0	0. 1 5	1. 0 5
実施例 1 1	0. 1	1. 0
実施例 1 2	0. 1	1. 0 5
実施例 1 3	0. 1 5	1. 0
実施例 1 4	0. 1	1. 1
実施例 1 5	0. 1	1. 1
実施例 1 6	0. 1 5	1. 1
比較例 9	0. 3	1. 5
比較例 1 0	0. 2	1. 5
比較例 1 1	0. 2	2. 0
比較例 1 2	0. 2	1. 5
比較例 1 3	0. 4	1. 5
比較例 1 4	0. 4	1. 5
比較例 1 5	0. 3	1. 5
比較例 1 6	0. 3	1. 5
実施例 1 7	1 0 0	1. 1
実施例 1 8	1 0 0	1. 0
実施例 1 9	1 0 0	1. 0
実施例 2 0	1 0 0	1. 0
実施例 2 1	1 1 0	1. 1
実施例 2 2	1 0 0	1. 0
実施例 2 3	1 1 0	1. 0
実施例 2 4	1 0 0	1. 1
比較例 1 7	2 0 0	2. 0
比較例 1 8	2 5 0	1. 5
比較例 1 9	1 5 0	1. 5
比較例 2 0	2 0 0	1. 5
比較例 2 1	2 0 0	2. 0
比較例 2 2	2 0 0	2. 0
比較例 2 3	1 5 0	2. 0
比較例 2 4	2 5 0	1. 5

[0195]

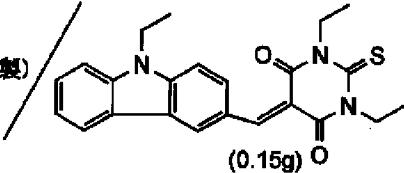
[Chemical formula 22]

実施例中の化合物

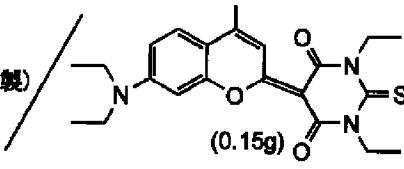
Y-1



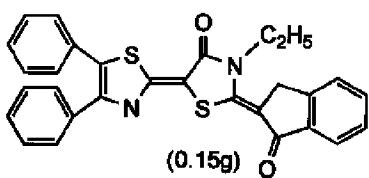
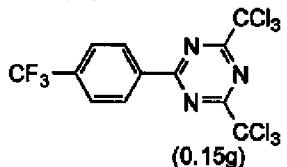
Y-2

CGI-784 (チバーガイギー社製)
(0.15g)

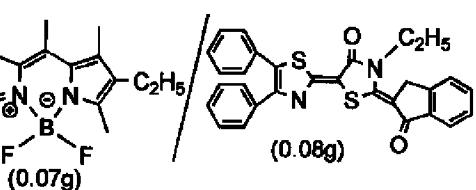
Y-3

CGI-784 (チバーガイギー社製)
(0.15g)

Y-4



Y-5

CGI-784 (チバーガイギー
社製)
(0.15g)

[0196]

[Chemical formula 23]

Z-1

ベンジルメタクリレート／メタクリル酸=70/30mol%の共重合体

Mw30000

Z-2

アリルメタクリレート／メタクリル酸=80/20mol%の共重合体

Mw40000

R-1

ペンタエリスリトールテトラアクリレート(ATMMT)

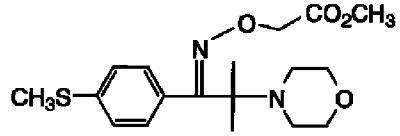
R-2

ジペンタエリスリトールヘキサアクリレート(DPHA)

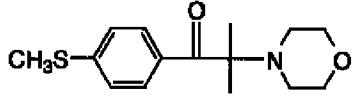
[0197]

[Chemical formula 24]

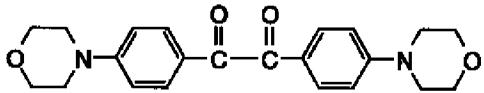
S-1



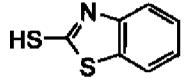
S-2



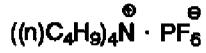
S-3



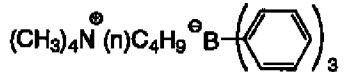
S-4



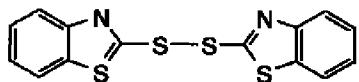
S-5



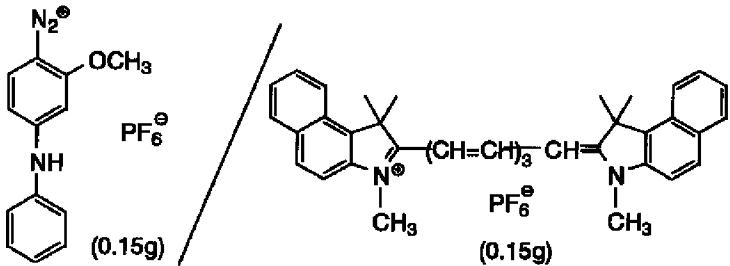
S-6



S-7

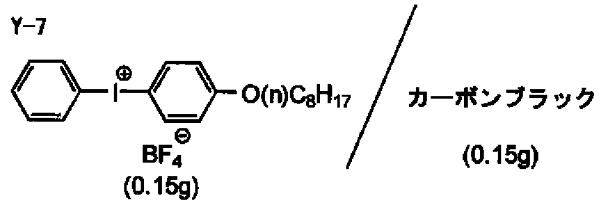


Y-6

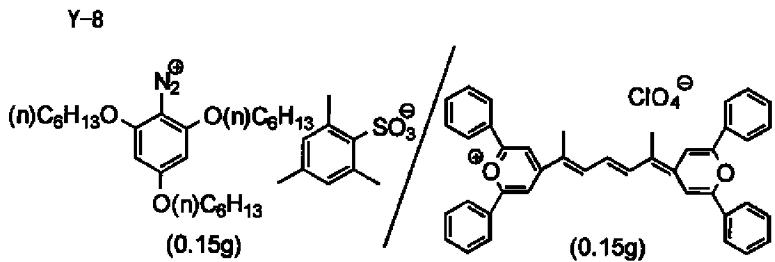


[0198]

[Chemical formula 25]



カーボンブラック
(0.15g)



4-(4-(4-(n-octylphenyl)phenyl)phenyl)phenyl cation ClO_4^- (0.15g)

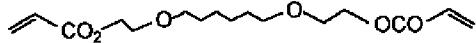


[0199]

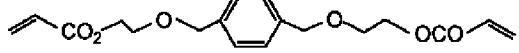
[Chemical formula 26]

比較例中の化合物：

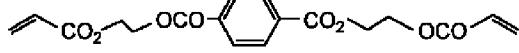
Xb-1



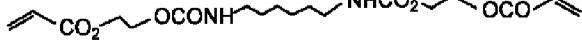
Xb-5



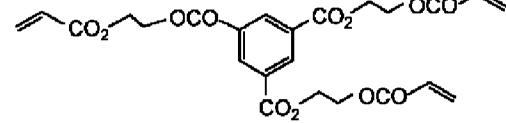
Xb-9



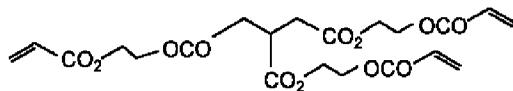
Xb-12



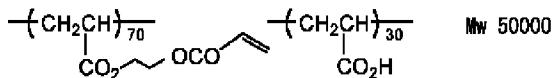
Xc-2



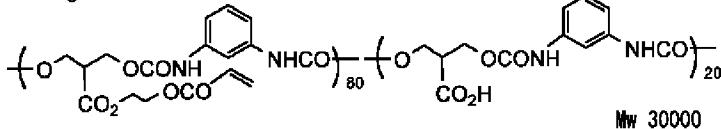
Xc-11



Xg-1



Xg-5



[0200]The photosensitive materials of this invention are high sensitivity, and its preservation stability is also better than table-5.

[0201]

[Effect of the Invention]According to this invention, it is providing a photo polymerization nature constituent splendidly compatible in the preservation stability which was most excellent in high sensitivity with high sensitivity in the optical radical polymerization system constituent by which promising ** is carried out also in image formation art. A photo polymerization nature constituent suitable as version material for monotonous printing which can be engraved directly can be provided from digital data, such as a computer, by recording using the solid-state laser which emits purple outdoor daylight, visible light, and infrared light especially, and semiconductor laser light.

[Translation done.]